Minnesota Plant Press

The Minnesota Native Plant Society
Newsletter

Volume 13, No. 1 **Fall 1993**

Upcoming Monthly Meetings

335 Borlaug Hall—7:30-9 PM

October 6. John Moriarity (Hennepin Parks): *Prairie Management in Hennepin Parks—A Brief History of Restoration Effects.* **POM:** Julia Bohnen, spiderworts (*Tradescantia* spp.)

November 3. Ann Hanchek (UM—Horticulture): *Wild Heritage of Common Garden Plants*; Annual Seed Exchange.

December 1. Dean Hansen (entomologist, wildflower propagation): *Butterfly Habitats: Native Plants in Gardens and Natural Areas.* **POM:** Diane Hilscher, rattlesnake master (*Eryngium yuccifolium*).

January 5. Mark Leoschke (botanist): *Rust Environment, The Geology and Flora of Fens*; **POM:** Charles Umbamhower, reed canary-grass (*Phalaris arundinacea*)

February 2. Dave McGlaughlin (UM Plant Biology): *Mushrooms and Minnesota Old Growth Forests;* **POM:** Mark Leoschke, shooting star (*Dodecatheon meadia*)

March 2. Char Bezanson (St. Olaf College, Biology): *School Nature Area Project (SNAP): Outreach to Minnesota Schools*; field trip introduction; annual meeting.

April 6. DNR speaker on recent survey discoveries. **POM:** Douglas Owens-Pike, bearberry (*Arctostaphylos uvi-ursi*)

May 4. Photo contest show; plant sale.

Apparent hybrids between *Erythronium albidum* and *E. propullans* grown from wild seed—Final Report

Thomas Morley

Plants of *Erythronium propullans* Gray bear fruit only occasionally under natural conditions. Banks (1980) found that these plants rarely if ever form seed when pollinated manually by pollen of their own species, but are 20% fertile when pollen of *E. albidum* Nutt. is used. Thus it is thought that the occasional fruits found in the wild must mostly result from cross pollination with *E. albidum*.

The author undertook to test this theory by growing naturally produced seeds taken from wild plants, to see what kind of offspring would result. Ninety-nine seeds were collected over 3 years and were planted in pots at the University of Minnesota Botany Department's St. Paul greenhouse. In an earlier report (Morley 1988), most of the results of this attempt were described; however, only one of the resulting plants had flowered by that time and that plant died after one season; its nature could not be determined with certainty. By 1988, only a single pot remained with living material. Fortunately one of the two plants present bloomed for several successive years and it became possible to determine that it must indeed be a hybrid. The history of the plants in this last pot is outlined below:

1981—14 seeds planted
1982—7 seedlings established
1988—2 non-flowering young plants remain, the rest have died
1989—1 plant flowers; the flower is 9 mm long but *remains closed.* The leaves are 11 and 24 mm wide. No offshoot is present on the flowering stem. The bulb (a "renewal" bulb, formed within the old one as the latter becomes exhausted) is 12 mm long. 1 non-flowering plant is also present, its leaf 13 mm wide, its bulb 8 mm long.

(continued on page 2, column 1, Morley)

(from Morley, page 1, column 2)

1990—1 plant flowers, the second plant has died. The flower opened but its tepals dropped before the author could measure them. Leaves 11 and 29 mm wide. No offshoot present on flowering stem. Bulb 18 mm long.

1991—plant flowers; tepals 18 mm long when flower is closed, 24 mm long when open, pale violet, turned up to horizontal position. No fruit formed, although the flower was self-pollinated by hand. Leaves 14 and 26 mm wide. *Flowering stem bears an offshoot runner 75 mm long* with a bulb 9 mm long and 6 mm thick. Main bulb 35 mm long, 10 mm thick. Both bulbs planted.

1992—1 plant appears and flowers; tepals pale violet, 22 mm long, fully recurved (tepal attitude varies with the age of the flower). Leaves 14 and 25 mm wide. *No offshoot is present on the flowering stem.* Bulb 25 mm long, 13 x 10 thick.

1993—plant has died.

Since plants of *E. albidum* never bear offshoots from the flowering stem, and plants of *E. propullans* always do, the behavior of this plant can best be explained if it was a hybrid between the two species and produced an offshoot when at its most vigorous state with ideal growing conditions. Apparently when conditions are less than ideal due to environmental change or possibly in this case because the same old soil was mostly used in re-potting, the new bulb, leaves, and tepals may be smaller and there may be no offshoot runner and bulb. Thus the hybrid is flexible in a character which is not flexible in either parent.

The tepal length in the presumed hybrid (22-24 mm) was about what would be expected for such a plant: tepals of *E. propullans* are about 8-18 mm long, those of *E. albidum* 15-36 mm. The flower stalk is similar: 11 cm long for the potted plant when measured in 1992, compared to 3.5-12 cm for *E. propullans* and 6.5-18 cm for *E. albidum*.

Leaf material of the plant in question was sent to Dr. John M. Pleasants of Iowa State University for electrophoretic analysis. He reported that such analysis did indicate some characters of each species to be present; details will be published elsewhere.

Another example of apparent hybridity was pointed out in the 1988 paper, where three non-flowering plants appeared in a pot in which only two were present the year before, indicating that one of the two bulbs had divided. Bulb division never occurs in *E. propullans* but is common in *E. albidum*, and could be expected in a hybrid.

The great losses occurring during germination and growth of the original 99 seeds have left only these two examples to indicate the origin of the seeds, but both point to a hybrid origin.

References cited

Banks, J.A. 1980. The reproductive biology of *Erythronium propullans* Gray and sympatric populations of *E. albidum* Nutt. (Liliaceae). Bull. Torrey Bot. Club 107: 181-188.

Morley, T. 1988. Observations on colonies and on seedling growth of apparent hybrids between *Erythronium albidum* and *E. propullans*. Phytologia 65: 97-102.

(Thomas Morley is professor emeritus, University of Minnesota, St. Paul Campus)

The Minnesota Native Plant Society

Minnesota Plant Press
Thor Kommedahl, editor

Newsletter of the
Minnesota Native Plant Society

Membership dues are $10 per year for regular members and includes subscription to the newsletter; dues for students and seniors are $8, for family $12, for institutions $20, and donors $25. Checks can be made out to: Minnesota Native Plant Society, and sent to : Minnesota Native Plant Society, 220 Biological Sciences Center, 1445 Gortner Avenue, St. Paul, MN 55108.

Three issues are published each year.

The Minnesota Native Plant Society is a tax-exempt 501 c3 organization as determined by the US Internal Revenue Service.

Greetings from the Minnesota Native Plant Society Board President

You will notice that I didn't make any reference to the weather in my salutation.

Let me introduce myself. I am Becky Schirber and I have taken over the responsibilities of the president of the MNPS Board as of right now! I came to the MNPS because of my interest in gardening and of course my desire to use native plants in pursuit of that passion.

I wanted you to know my philosophy of organizations such as the Minnesota Native Plant Society. I believe that organizations are only as strong as their individual members. My view is that even though the board is charged with directing the activities of the organization, it is imperative that ideas and action items flow up from the membership as well as down from the board. Going along with this view, members do not need to be on the Board to be active participants in the society. I have no one to quote on this view —which should convince you that I came to this position with no sort of expertise. When I was first elected to the Board a friend asked "Why are you doing that? Do you have a bone to pick?" My response was "No, I believe in community involvement and this is a way for me to educate myself while making a commitment to my community." What I want to say to you is "You too can become involved."

That leads me to the body of this letter: the annual calendar (next column) as well as a listing of the responsibilities in the MNPS and the names of those who have made a commitment to them (see page 4). Listed there are the names of persons who have agreed to be contacts for each of these activities. Please do not hesitate to contact these people if you are interested in making a personal investment in these areas of the Society's work. You will also notice some blank spaces— please contact me at to offer your assistance in these areas. We are especially in need of someone to chair the Symposium Committee. At the last Board Meeting we came up with a wonderful topic for this year's Symposium and great enthusiasm was generated around this activity, but we do need someone to spearhead this endeavor for us.

Just to reiterate membership involvement I thank the following members for their efforts which have made our Society a viable community resource: Pat Ryan, past board member and secretary of the board for 3 years; Don Knutson, past board member, president of the board for 2 years, and updater of our tax free status; Harriet Mason, past treasurer; Catherine Reed, last year's Symposium Chair; Bob Jacobson, past Newsletter Editor; Ray Robison "Minnesota Plant Press" distributor; Diane Hilscher, giver of life to the MNPS display; Rae Montgomery, collector and router of mail (all has been running so much more smoothly since Rae organized this for us!); Marcie O'Conner, keeper of the membership list; Linda Hahn, AV assistance at general meetings; Mary Ann Tucker, for taking around the MNPS display board; and the many people who were speakers, plant-of-the-month presenters at past meetings, and anyone else whose efforts are not written here but who are, nevertheless, not forgotten.

There are so many big and small ways that you can actively participate in the Minnesota Native Plant Society. Don't hesitate to become involved. I am looking foreword to working with all of you!

—Becky Schirber, President

Minnesota Native Plant Society Calendar

August
Board Meeting 8/4/93
Organize seed exchange

September
Board Meeting 9/15/93
Publish *Minnesota Plant Press*

October
Board Meeting (Pick Topic for Symposium, Field Trip Schedule) 10/6/93.
General Meeting (Hand out labels for seed exchange) 10/6/93.
Membership fee due.

November
Board Meeting (Nomination Committee convenes) 11/3/93
General Meeting (Seed Exchange) 11/3/93

December
Board Meeting (Firm up Field Trip Schedule) 12/1/93
General Meeting 12/1/93
Articles due for January issue *MPP*

January
Board Meeting 1/5/94
General Meeting 12/1/94
Publish *Minnesota Plant Press*

February
Board Meeting 2/2/94
General Meeting (Announce slate of Board Members) 12/1/93

March
Board Meeting (set plant sale) 3/2/94
General Meeting (Annual Meeting/ Election of Board Members) 3/2/94
Articles due for April *Minnesota Plant Press*
Native Plant Symposium 3/19/94

April
Board Meeting 4/6/94
General Meeting 4/6/94

May
Board Meeting 5/4/94
General Meeting (Plant Sale) 5/4/94

Opportunities are available for promoting MNPS activities

Arden Aanestad: Board member; brochure distribution to Nature Centers
Nancy Albrecht: Coordinator of Field Trips
Char Bezanson: Board Member
Chase Cornelius: Board Member, and Newsletter Committee
Linda Hahn: audio-visual arrangements
Diane Hilscher: Board Member, Vice-president; Program Committee; Education and Outreach Committee; Membership Committee; brochure distribution to Nature Centers
Rick Jannett: Board Member and liaison to Conservation Committee
Don Knutson: Membership Committee; Room reservation
Thor Kommedahl: Newsletter editor
Mark Leoschke: Board Member and secretary
Char Menzel: Plant Sale
Rae Montgomery: Membership Committee
Marcie O'Connor: Membership List
Ruth Phipps: Board Member and treasurer
Roy Robison: Board Member; mailing of *Minnesota Plant Press;* Publication Committee
Becky Schirber: Board Member and president
Dave Stevenson: Conservation Committee
May Wright: Seed Exchange
_____: Nomination Committee
_____: Elections Committee
_____: Symposium Committee

—Becky Schirber

Vascular plant distribution can be mapped using QUIKMap

The National Herbarium of Canada (CAN) has been mapping vascular plant distributions on a PC since 1991, using Canadian-developed software QUIKMap with a file and data manager. A digitized map of North America is included. For details, write to Erich Haber, Botany Department, Canadian Museum of Nature, PO Box 3443, Station D, Ottawa, ON, Canada K1P 6P4.

Display Board has been refurbished and is available for use

Society members are welcome to use the newly refurbished display board. Illustrated with beautiful color photos of Minnesota native plants, one side of the 3 x 3 foot board contains information regarding Society events, our newsletter, meetings, and field trips. The other side clarifies the difference between native and non-native plants and discusses plant communities, biomes of Minnesota, and stewardship. It also has a question/answer section with photos to test one's knowledge of nine (interesting!) native plants.

Diane Hilscher designed and completed the board with assistance from many other members. Most slides were generously supplied by Rick Haug, Diane Hilscher, Audrey Engels, and Dianne Plunkett. Slides were sent to the Slideprinter in Denver, Colorado, for prints (excellent results). Board members as well as May Wright, Welby Smith, and, Dave and Esther McGlaughlin reviewed and added information to the text. Roy Robison typed the text onto disk and Diane worked with Bob Jacobson to format and print the typed sheets. Bob scanned Vera Wong's original artwork for the Society logo onto disk also. Liz Walton helped with the mounting on foamcore sheets. Many thanks to all who contributed!

Already the board has been put to use by members: Chase Cornelius at the Minnesota Landscape Arboretum and Don Knutson at the Minnesota River Valley National Wildlife Refuge. In addition it was used at the Minnesota State Fair by members of our Society and members of the state horticultural society, and will be used at the Hennepin Park's "Prairie Days" by Diane Hilscher.

All are welcome to show our outstanding display board at events, museums, parties, and schools, provided that there is an attendant, or that it is safely displayed. It is sure to educate, entertain, and inform! To schedule showing of the board, call Don Knutson at .

—Diane Hilscher

Ants disperse the sticky *Trillium* seeds.

It's time to renew your membership in MNPS

October is the month to renew your membership in the *Minnesota Native Plant Society*. The year your membership is paid *through* is typed on your address label on the Newsletter. If you became a member of MNPS after 1 April 1993, you are already a paid member for the next year.

You can renew your membership at the October meeting of MNPS, or you can mail your check to MNPS. Membership fees and the mailing address are given in the box on page 2, column 3. The *Minnesota Native Plant Society* appreciates your membership support and your participation!

The Endangered Species Act Amendments of 1993 has been introduced in Congress

The House has introduced a bill by Rep. G. Studds (HR 2043) and the Senate a bill by Sen. M. Baucus (S. 931).

Both bills set deadlines for recovery plan completion with priority given to multi-species plans. Each bill would establish a revolving fund for grants for habitat conservation.

Several bills have been introduced in the House of Representatives that are designed to reduce the jurisdiction of the of the Endangered Species Act.

Reauthorization of the Endangered Species Act is expected in 1994.

—from AIBS Forum, Vol. 12, No. 2, 1993

Wild-collected bulbs and wildflowers treated in new guide

The book, *Gardener's Guide to Plant Conservation*, published by the World Wildlife Fund/TRAFFIC and the Garden Club of America, provides the most up-to-date information on the collecting/propagation status of species of North American wildflowers, bulbs, carnivorous plants, and terrestrial orchids, according to a memo distributed by Faith T. Campbell, of the Natural Resources Defense Council, 17 March 1993.

Minnesota's Native Mistletoe

Don Knutson

Among Minnesota's 1,800 or so native plants, none is more unknown to plant enthusiasts than our native dwarf mistletoe, *Arceuthobium pusillum* Peck. Most Minnesotans are not aware that we have a mistletoe as part of our native flora. Part of the reason for this obscurity is its growing habits; it lives parasitically on the living limbs of black spruce trees. And black spruce trees grow in swamps. So, unless you're inclined to go wading to see rose pogonia (*Pogonia ophioglossoides*) or grass pink (*Calopogon pulchellus*) in bloom, you are not likely to see the black spruce dwarf mistletoe. And even when you do see it, it is difficult to admire it.

It is a small plant, with leafless aerial stems 1-3 centimeters long. It is smaller than the other 20 or so species of dwarf mistletoe that occur naturally in the United States. Like all the dwarf mistletoes, our Minnesota native lives exclusively on conifers. While black spruce is its primary host, it does infect other spruces, Eastern larch and, occasionally, pine trees. It is found from Minnesota on the west, through Wisconsin and Michigan and throughout the New England states as far south as northern New Jersey and Pennsylvania. In Canada, it is found from east-central Saskatchewan (even with the North Dakota-Montana border) to southern Ontario, Quebec, and throughout the Maritime Provinces and Newfoundland.

I want to tell you about the life style of this curious, dicotyledonous plant that lives parasitically on its evergreen host. Maybe I should say two plants, since it is dioecious, that is, each plant is one sex or the other, and the small stems, or shoots, are referred to as either pistillate shoots or staminate shoots.

These shoots bear the flowers in April and May, with extremes from late March to June. The staminate flowers, 2 millimeters in diameter, can be identified at this time by the small pollen sac (anthers) on the top of each of the three petals. The female, or pistillate, flowers are not seen as flowers, but are distinguishable by a tell-tale drop of sugary fluid over the tiny, recessed flower. It is thought that the pollen grains are carried by insects or wind to the drop of fluid and that later the drop is absorbed down into the female flower, carrying the pollen to the stigma of the female flower. There are normally 5-15 flowers per aerial shoot.

Seeds mature within a fruit in September and October of the same year as pollination. Mistletoe seeds are explosive. As seed approaches maturity in the fall, the fruits, which are shaped somewhat like an avocado, enlarge, fill with fluid and become turgid. At the same time, an abscission zone forms near the stem end of the ripening fruit, and the stem (pedicel) curves down, much like a cherry does. Eventually the abscission zone is weakened so that a slight movement in the wind causes a complete failure at the abscission zone. This causes the fruit case to fall away, allowing the fluid to escape, pushing the seed out to a distance of up to 20 feet. The late Dr. Hawksworth used high speed photography to determine that the mistletoe seeds can travel nearly 60 miles per hour!

The mistletoe seed is a remarkable propagule! To begin with, it has no seed coat, but has, instead, a gelatinous mass of fibrous sticky material, called *viscin* which surrounds the seed. This functions to 'glue' the seed to whatever it strikes in its flight. The hazards to this 'naked' seed are many. Only those seeds that land on live spruce trees have a chance of surviving.

The sticky mistletoe seed, traveling at 60 mph, typically is intercepted by the spruce needles. However, the mistletoe cannot infect needle tissue, but must infect woody twig tissue. To get the mistletoe seed to the twig, the sticky viscin, surrounding the mistletoe seed, has a remarkable quality: as soon as it rains, the viscin absorbs water and loses its adhesive qualities and becomes very slippery.

This allows the seeds to slide down the needles to the woody twig. Later the viscin dries and hardens, holding the seed in its precarious position until the following spring when it will germinate.

During the fall, winter and early spring, the mistletoe seeds are eaten by birds and insects. Those that survive begin germinating in March and April. In this they are similar to other seeds. They are different, however, in that the emerging root tip does not grow straight down toward the center of the earth. The emerging growing tip—called the radicle—is insensitive to the pull of gravity. But it is sensitive to light and grows away from light and toward the darkest place. The advantage of this is clear for those seeds that are positioned on the bottom of horizontal twigs. As seeds germinate, the radicle tip, ignoring gravity and growing away from light, will grow upwards toward the woody twig.

After contacting the twig, the radicle tip forms a mass of tissue called a holdfast. Within the holdfast tissue, a new growing point forms which penetrates the host twig by a combination of enzymatic action and mechanical force. Like many aspects of mistletoe, this phenomenon is poorly understood.

The invading mistletoe tissue grows through the bark to the ray tissue of the wood. Here the xylem of the mistletoe forms an intimate union with the host xylem. It is this arrangement that is the primary basis for transfer of metabolites from the tree to the parasite.

The mistletoe plant within the twig tissue now branches and grows throughout the inner bark, eventually pushing aerial stems up through the bark, producing flowers and repeating the cycle.

There are many more amazing things to tell you about the black spruce dwarf mistletoe:

- How does mistletoe cause the spruce host to produce 'witches brooms'?
- Why are there stomates on the radicle?
- Why do the seeds have chlorophyll (both chlorophyll a and b)?
- What ecological roles does black spruce mistletoe play in wetlands?
- Does air pollution threaten black spruce dwarf mistletoe?
- Which birds and mammals spread mistletoe seeds?

But let's save these for another story. Meanwhile, please respect one of our smallest, least well-known and most unusual of native Minnesota plants!

Xanthoxylum americanum (prickly ash) is the only member of the citrus (rue) family (Rutaceae) native to Minnesota.

Seed Collection and Storage

Char A. Bezanson
St. Olaf College

Introduction

Sharing seeds of native plants from our gardens or collecting the seeds of wild native plants can be a rewarding endeavor. To collect seeds successfully, the collector must become familiar with the life cycle and natural history of the plant, especially its flowering, fruiting, and germination habits. Some plants self-seed readily as soon as seeds are produced, while other seeds require a long after-ripening period, a winter cold treatment, or other specific conditions. Some plants produce seeds with high germination rates under the appropriate conditions, while some produce seed that seems utterly useless, and refuses to germinate in any quantity under any conditions. Information is available about the requirements of many plants, especially those commonly grown in gardens, but there are many holes in the published literature, which leaves lots of room for experimentation by amateur botanists.

Timing of Collection

Seeds should be collected when they are mature, or nearly so. Part of the maturation process involves drying of the seed: moisture is high in immature seeds (60%) but drops to about 10% as seeds mature. Often, you can tell if a seed is mature by pinching it between thumb and forefinger; if the soft center extrudes from the seed, it is not mature. Once the seed is mature, it can usually not be squashed even by biting it.

Many native plants have dry fruits or seeds which fall from the plant when mature, so timing is critical if seeds are to be recovered. Often, seeds mature sequentially from bottom to top (or *vice versa*) of an inflorescence, so that repeat visits are necessary. In some situations, the entire inflorescence can be collected in a paper bag and the seeds allowed to mature on the plant material.

Processing

Drying. When seeds are collected, their moisture content is usually higher than desirable for good storage. Good air circulation around freshly collected seeds and use of paper or mesh bags for collection rather than plastic will help prevent spoilage of seeds and assist in drying. Allowing seeds to dry on supporting plant material is also helpful, as the other plant material will tend to draw moisture from the seeds. Moving warm, dry air around the seeds will also lower their moisture content. Remember, however, that seeds are living organisms: avoid drying with high heat if you want viable seeds! For many seeds, temperatures over 100 °F are lethal.

Cleaning and Threshing. When the seeds are mature, it is important to detach seeds from the supporting plant material, and to separate the seeds from this material. The seeds must stay dry if they are to be successfully stored, and material from the inflorescence will tend to retain moisture as well as support decomposers such as fungi and bacteria.

Initial cleaning can be done by screening through hardware cloth or other appropriate material. This will remove large pieces of plant material, but many seeds will then require threshing. Threshing of seeds involves removing fruit and inflorescence material (such as glumes, bracts, pods, and dry fruit parts) by mechanical action. It can be done by pressing between bricks, by bagging the material and walking on it, or by any number of homemade devices involving screens, paddles and washboards. The chaff is then blown or screened away. Parts of this operation can also be done by hand.

Plants with fleshy fruits require a different treatment. For example, elderberry seeds can be collected by whirling the fruits with water in a blender, then spreading out the resulting pulp and hand-picking or screening out the seeds.

Storage

Moisture content and temperature are the two most important variables in successful seed storage. Each 1% reduction in seed moisture content (down to about 6%) doubles seed life. Each 10% reduction in temperature (down to 32 °F) doubles seed life.

Removing moisture from seeds is done by lowering the relative humidity of the surrounding air, which can be done by refrigeration or by desiccation. Refrigerated air is both drier and cooler than room air.

Seeds must equilibrate with 65% relative humidity (or less) for 1-year storage, 45% for 2-3 year storage, and 25% for long-term storage (5-6% seed moisture content).

Dry seeds (<14% moisture) can be stored in the freezer; however seeds must be in moisture-proof containers.

In summary, reasonable storage conditions for several seasons can be provided by storing envelopes of fully mature and dry seeds in heavy zip-lock bags in the refrigerator. Longer storage requires more ideal conditions.

Record Keeping and Labeling

Good record-keeping is important if you want to learn about your plants and develop a working knowledge of techniques that you have found to be successful. If you exchange seeds with others, the following minimum information will be helpful:

Species (scientific and/or common name); habitat (sunny well-drained garden, dry woodland, marsh, etc.); collection site; collection date; collector; storage since collection.

Minnesota Native Plant Society Seed Exchange

The Minnesota Native Plant Society sponsors a seed exchange every autumn. This year the exchange will take place at the November meeting. Seed envelopes with spaces for the appropriate seed data (see above) will be available for pickup at the October meeting for anyone needing them; otherwise, please provide similar information on your own labels. As usual, those who bring seeds to exchange will have first choice of seeds, but the exchange will then be opened up to all members.

Reference

Young, J. A., and **Young, C. G.** 1986. Collecting, processing and germinating seeds of wildland plants. Portland: Timber Press.

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Minnesota Native Plant Society

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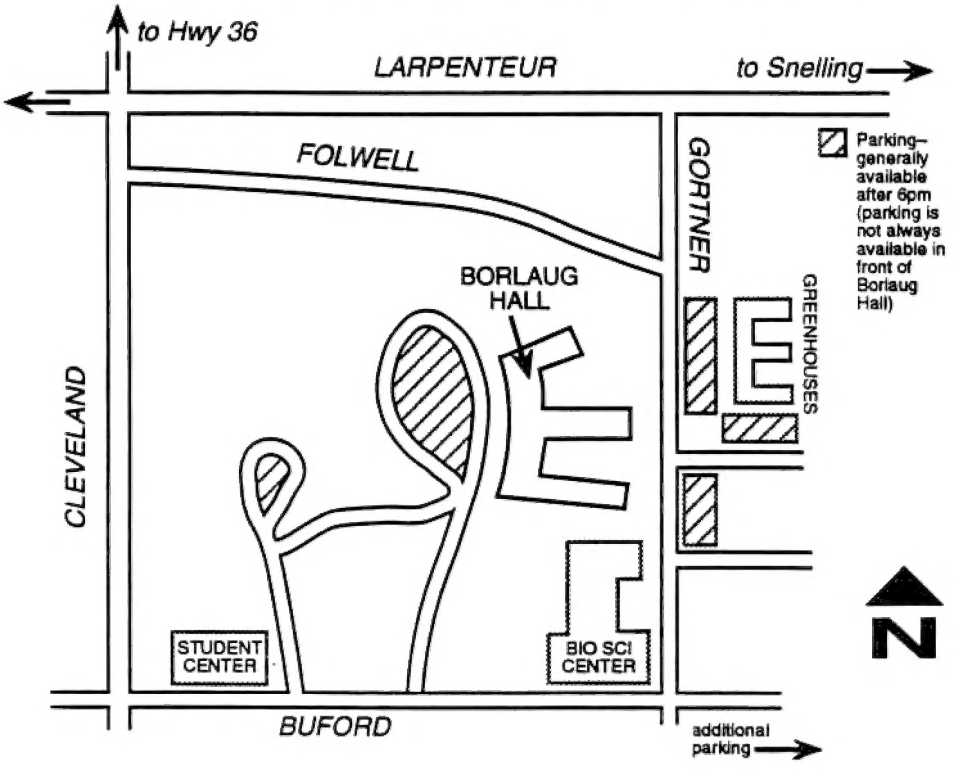

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The Minnesota Native Plant Society
Newsletter

Volume 13, No. 2 **Winter 1994**

Upcoming Monthly Meetings

335 Borlaug Hall—7:30-9 PM

February 2.
Dave McLaughlin (UM Plant Biology): *Mushrooms and Minnesota Old Growth Forests*
Plant-of-the-Month: Mark J. Leoschke, shooting star (*Dodecatheon meadia).*
Board Meeting: 6 PM, Student Center. Announce slate of candidates.

March 2.
Char Bezanson (St. Olaf College, Biology): *School Nature Area Project (SNAP): Outreach to Minnesota Schools*; **field trip** introduction; annual meeting.
Board Meeting: 6 PM, Student Center, set plant sale date; hold annual meeting and election of Board members. Deadline for articles for spring issue. Finalize details of Symposium for March 19.

April 6.
Scott Zager (DNR County Biological Survey): *Plant Geography of the Minnesota Blufflands.*
Plant-of-the-Month: Douglas Owens-Pike, bearberry (*Arctostaphylos uvi-ursi).*
Board Meeting: 6 PM, Student Center.

May 4.
Photo contest show; plant sale.
Board Meeting: 6 PM, Student Center.

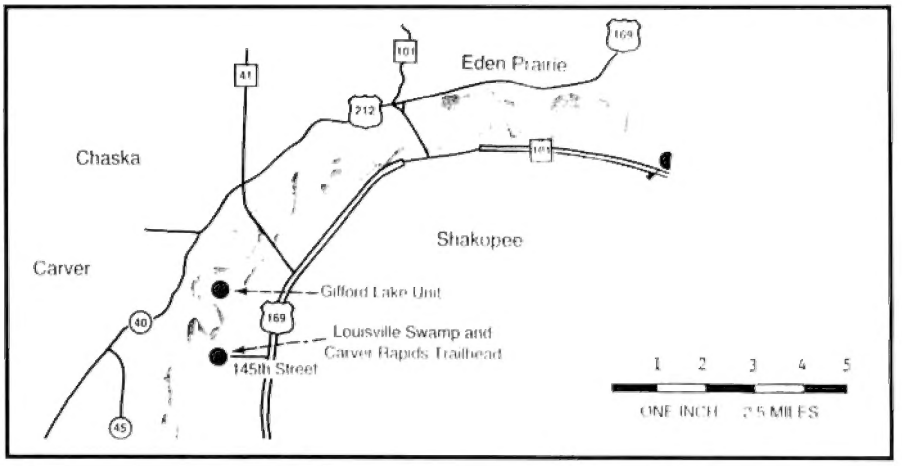
Plan to attend the symposium on March 19, 1994

Volunteer search for endangered native species at the Minnesota Valley Wildlife Refuge was not stopped by the flood last spring

Mary Stanley

On June 19th, 1993, as the Minnesota River was overflowing its banks, 15 intrepid volunteers from the Twin City area and Iowa gathered at the Louisville Swamp Unit of the Minnesota Valley Wildlife Refuge to do a 4-day plant survey. The group was to look specifically for the endangered species *Besseya bullii* (kittentails). This survey was sponsored by the Garden Club of America as part of their "Partner for Plants" project—a national effort by The Garden Club of America to encourage and support volunteer efforts for endangered plant work on federally managed public lands.

The first area surveyed was the Little Prairie Loop area adjacent to the parking lot and interpretive display at the end of 145th Street off Highway 169, about 4 miles north of Jordan (see map). Scattered throughout this upland area were small rock outcroppings where the soil was very shallow. These outcrops showed significant amounts of prairie species, including *Amorpha canescens* (leadplant), *Besseya bullii* (kittentails), *Campanula rotundifolia* (harebell), *Dalea purpurea* (purple prairie-clover), *Delphinium virescens* (prairie larkspur), *Gentianopsis procera* (lesser fringed gentian), *Geum triflorum* (prairie smoke), *Hedyotis longifolia* (bluets), *Lespedeza capitata* (bush-clover), *Lithospermum* *(continued on page 2)*



(continued from page 1, Stanley)

canescens (hoary puccoon), *Psoralea argophylla* [=*Pediomelium argophyllum*] (silvery scurf-pea), *Sisyrinchium campestre* (blue-eyed grass), *Viola pedata* (bird's-foot-violet), and *Viola palmata* (wood violet).

Some of the prairie grasses encountered were *Andropogon gerardii* (big bluestem), *Bouteloua curtipendula* (side-oats grama), *Muhlenbergia* spp. (muhly grass). *Schizachyrium scoparium* (little bluestem, and *Sorghastrum nutans* (Indian grass).

Along the rocky edge of the bluff that overlooked the river valley, small populations of prickly-pear cactus were located. That view of the Louisville Swamp under 10 feet of water was impressive. In its place was a huge lake that covered many hundreds of acres.

Although this first area surveyed was quite degraded and had many introduced species, it has the potential for management to enhance and improve the quality of the site.

The Carver Rapids Unit was also surveyed (see map). In the northeast section, a large population of *Opuntia fragilis* (little prickly-pear) was found. The individuals and clusters of stems (183) were located at the edges of partially exposed boulders. This population is very likely one of the largest in the state.The southern portion of the Carver Rapids Unit was a less disturbed area but it had the most diverse species, including *Corallorhiza maculata* (spotted coral-root), which is normally a species of the Arrowhead Region of Minnesota.

The third area that was looked at was a small section adjacent to the Chicago & Northwest Railroad at the farm parking area. This location was the least disturbed of all the areas surveyed and showed the best examples of oak savanna vegetation.

If you want to learn and recognize some of our native prairie species, visit this area very close to the Twin Cities and spend some time with your field guides. Happy hunting!

Mary Stanley has been a longtime fan of native plants and has grown her own prairie garden. She is active in the Garden Club of America, and the Minnesota Landscape Arboretum, and she serves on its Board.

Spring Field Trips

1) **WARBLERS AND WILDFLOWERS.** TNC Nerstrand Big Woods Park Tour. Wednesdays, April 20, 27; May 4: 7:30 to 9:30 AM.

Join Kim Chapman and Nancy Falkum, Minnesota Chapter of the *Nature Conservancy*, for a walk in Nerstrand Big Woods State Park to see early spring ephemerals and migrating songbirds. Meet at the picnic/parking area. ***Phone reservations are required.*** Call Julie or Janet at . Wear waterproof shoes and clothes.

2) **LICHENS OF THE ST. CROIX VALLEY.** Interstate State Park, Taylors Falls. Saturday, April 23; 10:30 AM to noon.

Explore the fascinating lichens that grow in the pothole area of Minnesota's Interstate State Park, with lichenologists Jim Schuster and Nancy Albrecht. Meet in front of the Interpretive Center. *Phone reservations are requested* by calling Jim at , or Nancy at (after 6 PM). Wear sturdy walking shoes.

3) **NATIVE PLANT NURSERY AND PRAIRE TOUR.** Crow-Hassan Park Reserve, Hennepin Parks. Saturday, May 7: 9 AM to 1 PM.

Join John Moriarty of Hennepin Parks for a tour of the native plant nursery in the Crow-Hassan Park Reserve, and to a restored prairie in the park to search for early spring forbs. Meet at the Crow-Hassan Nursery. *Phone reservations are requested.* For directions and reservations, call
Wear appropriate clothing and shoes.

Optional equipment for all three trips include cameras, binoculars, hand lens, and field guides.

No fees are required except daily or annual parking permits.

Summer field trips will be announced in the Spring Issue of *Minnesota Plant Press.*

—Nancy Albrecht

The fenced area of the Eloise Butler Wildflower Garden's Upland Prairie will be increased by 1 acre to make this area 20% larger, pending Park Commission approval—*The Fringed Gentian* 43[4], 1993

The Minnesota Native Plant Society

Minnesota Plant Press
Thor Kommedahl, editor

Newsletter of the
Minnesota Native Plant Society

Membership dues are $10 per year for regular members and includes subscription to the newsletter; dues for students and seniors are $8, for family $12, for institutions $20, and donors $25. Checks can be made out to: Minnesota Native Plant Society, and sent to : Minnesota Native Plant Society, 220 Biological Sciences Center, 1445 Gortner Avenue, St. Paul, MN 55108.

Three issues are published each year.

The Minnesota Native Plant Society is a tax-exempt 501 c3 organization as determined by the US Internal Revenue Service.

Prairie Recreation and Management in Hennepin Parks

Hennepin Parks personnel have been planting and managing prairies since 1968. Prairie recreation now exceed 650 acres in 7 parks. The largest planting is in Crow-Hassan Park Reserve with 540 acres. Some plantings are small and designed as interpretive prairies and prairie gardens.

The recreation process has evolved from hand broadcasting of out-of-state tree seed to the use of Truax seed drills with locally collected seeds. Hennepin Parks currently uses 6 species of grasses and 75 species of forbs in prairie plantings. Plantings vary from 2 to 70 acres.

The quantities of seeds and plants used are not appropriate for home prairies but the techniques are applicable. First, all vegetation should be removed from the site, either with an herbicide or by hand. Second, grass and forb seeds should be sown in mid-June. Forb seeds should be sown on the soil surface, whereas grass seeds should be raked into soil. If the site is small, the proportion of grass should be reduced to allow forbs to dominate. Seedlings, mainly species difficult to start from direct seeding, are planted after the seeding is done. Seedlings must be watered and protected from browsing for the first growing season. During the first 2 years, noxious weeds should be controlled. Prairies take years to mature, so be patient. Additional forbs can be added over the years by broadcast seeding or by adding seedlings, especially after grasses have matured (5-6 years).

Hennepin Parks manages its prairies with controlled burns on a 2-4 year rotation, in spring. Herbicides are used selectively to control invasive weeds such as leafy spurge, thistle, bird's-foot-trefoil, and crown vetch. Handpulling is effective in small areas.

Additional information on Hennepin Parks' prairies is available from: John Moriarty,

Summary of October Meeting Presentation at MNPS by John Moriarty, Wildlife Specialist for Hennepin Parks.

Butterfly Habitats: Native Plants in Gardens and Natural Areas

Wildflowers, in nature or in a garden, are beautiful and rewarding. An entomologist appreciates wildflowers also for their role in attracting butterflies, bees, beetles, flies, and other insects. Many species of butterflies are attracted to nectar, in particular, but their larvae feed on vegetative parts. Planting a "butterfly garden" is an increasingly popular activity.

Many butterfly species are attracted also to mud (presumably for minerals such as potassium and calcium), dung, urine, and rotting fruit. A "home brew" can be made by mixing brown sugar, beer, and molasses. Shrubs serve as perching sites for males to await females. Butterflies are less picky about plant species than most gardeners are, e.g., thistles or hoary allysum are more attractive to butterflies than to humans.

A "tongue-in-cheek" butterfly garden consists of a good mud puddle, coyote droppings around the edge, beaver urine and castor, squashed bananas, a few hazel bushes for perching, and lots of thistles. A more neighbor-friendly garden would include butterfly-weed, and rough blazing star. The latter species is a butterfly magnet, especially for monarchs migrating south. Other choices are any milkweed, prairie blazing star, joe-pye weed, ironweed, and various asters.

But why not observe butterflies in the wild? Actually, I have mixed feelings about "butterfly gardens." Sure, they will attract butterflies and reward the gardener. They could also help educate a youngster or entophobic adults about butterflies. But could one duplicate something like Iron Horse Prairie, or the Kellogg-Weaver Sand Dune area? Will dozens or even thousands of individual scattered butterfly gardens ever benefit butterflies?

So, plant an area specifically with butterflies in mind. But then explore roadsides, parks, prairies, preserves, or the DNR Scientific and Natural Areas, and see butterflies in their natural habitats. Help protect natural areas, for when they disappear, no number of butterfly gardens will replace them.

Summary of December Meeting Presentation by Dean Hansen, Entomologist.

Please renew your membership in Minnesota Native Plant Society now

There is still time to renew your membership and receive the big Spring issue of the MNPS Newsletter. Your continued support is important in the effort to build awareness of our Minnesota native plants and to let people know about the Society and the work it does to foster interest in our native species.

The year your membership is paid *through* is typed on your address label on the Newsletter. You can renew your membership today by mailing your check to MNPS. Membership fees and the mailing address are given in the box on page 2, column 3. Or, you can renew your membership at the next monthly meeting.

The **Minnesota Native Plant Society** appreciates your membership support and your participation.

Display Board of MNPS

All members are welcome to show our outstanding display board at events, museums, and schools, provided that there is an attendant or it is safely displayed. With infomation on the Society, native plants, and stewardship, the double-sided board is 3 feet by 3 feet. To schedule use, call Don Knutson at

Photo contributors were listed in the Fall Issue; however some contributor names were omitted. The sentence should have read *"Most slides were generously supplied by Rick Haug with some from May Wright, Janet and Janice Robidoux, Linda Huhn, Diane Hilscher, Audrey Engels, and Dianne Plunkett."* Thanks to each of you!

SYMPOSIUM: *Native Plants and Their Interactions with Other Organisms*, March 19, 1994, at Earle Brown Center, St. Paul Campus. Registration 8:30 AM. Sessions from 9 AM to 3 PM.—D.M. Knutson, Program Chair

Pollination notes on Minnesota orchids: heartleaf twayblade

Charles Argue

One of only three species of *Listera* known to occur in Minnesota, the heartleaf twayblade (*L. cordata* [L.] R. Br.) is a common but inconspicuous and often overlooked orchid of moist northern woods and cold balsam-cedar-spruce bogs, but is also found in thick, rather dry moss mats on headlands and in spruce-fir forests on the north shore of Lake Superior.

From early spring to mid-July, it bears small, light green to purple flowers in long slender racemes. The lip or labellum of each flower is flattened, bent sharply downwards from a point near its insertion (Fig 1A), and is notched at its tip (Fig. 1B). In the center of the flower is the small column, a specialized structure that includes the anther, the stigma, and accessory elements (Fig. 1D). The anther (Fig. 1C) is positioned behind a large, thin, leaf-like structure called the rostellum (Fig. 1C). It dehisces in the bud and two club-shaped pollinia (Fig. 1C) are released and held unattached on the broad rostellum, enfolded by its incurved margins. The downward pointing labellum serves as a landing platform for visiting insects. A minute amount of nectar is secreted into a superficial groove, the nectar groove, which runs down the center of the labellum (Fig. 1B). The insect, feeding on the nectar, crawls slowly up the labellum until its head contacts the rostellum. In some instances, at least, proper orientation of the insects in relation to the column also involves taking nectar from a nectary on the basal disc just beneath the column. When any of three small trigger hairs on the base of the rostellum are touched (Fig. 1C), an adhesive, held under pressure, is forcibly ejected onto the head of the insect, and the rostellum is immediately reflexed, releasing the pollinia onto the drop of rostellar glue. The glue dries in several seconds, and the pollinia are firmly attached to the head of the insect. The pollinia lack the short stalks present in some orchids which twist to align them with the stigmatic cavity of the next flower. Instead, about a day following discharge of the pollinia, the rostellum folds upward, freeing the passage to the receptive stigma (Fig. 1D), which has now become very sticky. Nectar is resecreted into the nectar groove, and if another insect that has visited a younger flower and has pollinia cemented to its head makes its way up the labellum as before, the pollinia will contact the stigma and pollination will occur. Because only fragments of the pollinia are left behind on the stigma, a single insect may pollinate several flowers with a single set of pollinia.

Although *L. cordata* is self-compatible, it is not usually self-fertilizing. The pollen grains of some species of *Listeria* have been reported to dry-out and a few, perhaps because of the activity of thrips, can become detached from the pollinia and contact the stigma, effecting self-pollination. The same process, apparently in the absence of thrips, may occur in *L. cordata*. Differences in the coherence of pollen grains, however, suggest that their disassociation is less likely to occur in *L. cordata* than in most other species of *Listera*.

Although fertilization between two flowers on the same plant is possible, many of the insects implicated in the pollination of this species are said to work from the bottom to the top of the racemose inflorescence. Younger flowers near the top of the inflorescence have exposed pollen and covered stigmas, older flowers near its base have exposed stigmas. This combination of factors promotes cross pollination of the older, basal flowers.

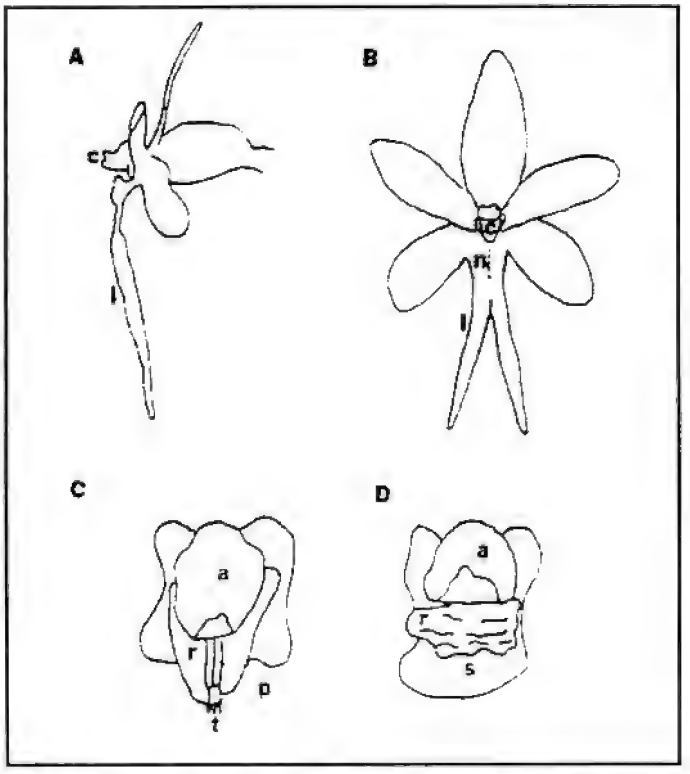


Fig. 1. Floral diagrams of *Listera cordata:* A- flower side view; B-flower face view; C-Column; D-Column, rostellum retracted [a-anther, c-column, l-lip, n-nectar groove, p-pollinia, r-rostellum, s-stigma, t-trigger hairs.

Insects are attracted to the flowers of *L. cordata* by their odor and nectar. The labellum apparently secretes nectar in all species of *Listera*, but the flowers of some species are said to be scentless. The odor in *L. cordata* is fetid, and a similar odor is produced by some other species. Nevertheless, the flowers of *L. cordata*, at least, do not appear to be pollinated by insects normally attracted by the odor of decaying flesh nor does it deceive its pollinators by mimicking the odor of their larval foods.

The larval pollinators of *Listera* are thought to be nectar-seeking wasps and primitive flies. The nectar is well exposed, and the pollination mechanism is simple and can be operated by many small insects. In studies done in Europe, ichneumons are said to be attracted in large numbers to the flowers of *L. ovata*, as are beetles and other insects. Beetles are generally con-

(continued on page 5)

Pollination Notes (from page 4)
sidered ineffective pollinators, but have been reported to be competent in *Listera*. Even some predatory insects, e.g. *Chlorophyta torrentium*, usually destructive to flowers and generally associated with primitive blossom types, are recorded as pollen vectors of *L. ovata*. Bees will visit the flowers casually for nectar. Visual clues, however, are apparantly inappropriate for proper orientation, and they are not considered effective pollinators.

Fungus gnats are by far the most common pollinators of *L. cordata* in the redwood forests of northern California; however, this may be a local phenomenon related to the abundance of these insects. Members of other insect groups have been seen carrying pollinia, and no adaptation to a specific pollinator is evident. The fungus gnats orient themselves more or less randomly with respect to the column while taking nectar from the labellum, but when feeding on the nectar secreted from the nectar disc just beneath the column, they usually position their heads toward the column, and the pollinia are, therefore, most often attached to their heads.

Although the behavior of flies, wasps, and beetles is often considered erratic, fruit set in *L. cordata* is higher than that recorded for temperate, terrestrial, nectiferous orchids pollinated by butterflies, bumblebees, moths, and syrphids. Thus *Listera*, thought by Darwin to have one of the most refined flower types among the orchids, provides an example of a genus that has evolved specialized flowers but is, nevertheless, efficiently pollinated by relatively unspecialized insects. The significant feature here is the exposed nectar, which allows the utilization of the flower by a variety of insects with primitive mouth parts.

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Dr. Charles Argue is an Honorary Research Associate in the Department of Plant Biology at the University of Minnesota, St. Paul. His PhD was earned at the University of Minnesota. He taught in Central College, Iowa.

Wild Heritage of Garden Plants

Collectors have been importing interesting species to gardens since Queen Hatshepsut brought plants from Somalia to Egypt in 1495 BC. The botanical riches of North America similarly dazzled Europeans in gardens of Spain, England, and France. By selection and hybridization, English and German horticulturists improved plants for garden use, e.g. phlox, michaelmas daisy, sneezeweed, and lupines.

The michaelmas daisy, *Aster novi-belgii*, was brought to England where it was called "starwort." Ballard developed the cultivar Beauty of Colwale in 1907, which led to others. Current interest is in developing turtlehead, phlox, blue-eyed grass, and others.

Summary of November meeting of MNPS by Prof. Anne Hanchek, Horticultural Science, University of Minnesota, St. Paul.

Minnesota Orchids: Such a Deal!

Orchids of Minnesota, written by Welby Smith and illustrated by Vera Wong—both MNPS members—is now in print.This well-written book has beautiful photographs and drawings of our native gems. It is available in bookstores for $25. The University of Minnesota Press, however, has made a special offer to members of the Society. Copies of this book can be purchased through the Society for only $13. The first order sold out at the December meeting of MNPS, and the book generated so much interest that a second order will be placed. Checks for the book(s) must be made out to the *Minnesota Native Plant Society* and mailed to Mark J. Leoschke, 5817 73rd Avenue North #134, Brooklyn Park, MN 55429 (612/566-2333[home]; 551-2481[work]) by February 1, 1994. The Society's order will then be placed with the Press. Books will be available for distribution at the March meeting of MNPS, and at the Native Plant Symposium. Members may also arrange to pick up their books at some other time. We thank the University of Minnesota Press for this wonderful opportunity!

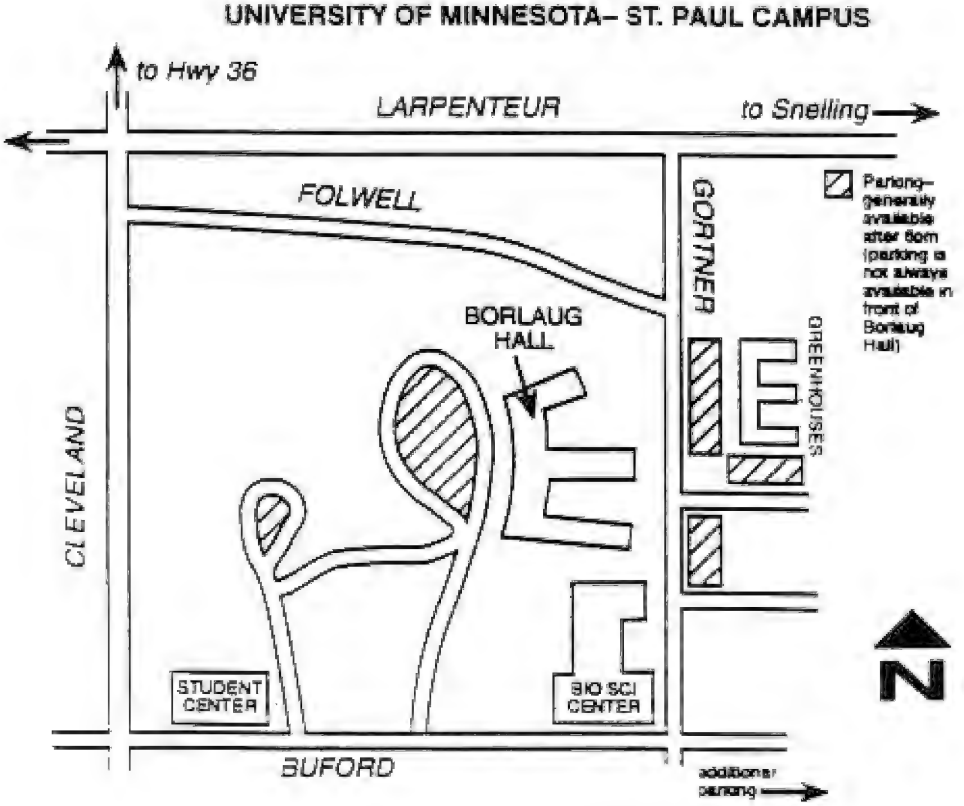
—Mark J. Leoschke

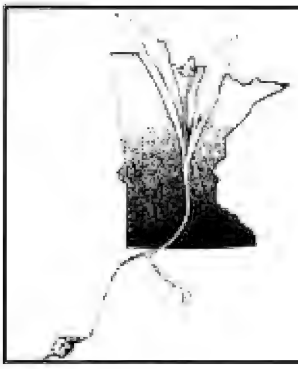
Leedy's roseroot found only in Minnesota and New York

Leedy's roseroot (*Sedum integrifolium* ssp. *leedyi*), a federally listed threatened species, is a plant found only in Minnesota and New York. The Minnesota Department of Natural Resources and the US Fish and Wildlife Service recently published a booklet about this plant entitled *Leedy's Roseroot, A Cliffside Glacial Relict*. Written by Natural Heritage Botanist Nancy Sather, and published in 1993, the booklet describes the plant, its habitat, and threats to it, and it is illustrated with excellent color photographs. Copies may be requested from Zella E. Ellshoff, Botanist, Division of Endangered Species, US Fish and Wildlife Service, 1 Federal Drive, Fort Snelling, Minnesota 55111; telephone 612/725-3276. *—Z.E. Ellshoff*

Minnesota Native Plant Society
220 Biological Sciences Center
University of Minnesota
St. Paul MN 55108

Minnesota Native Plant Society





Minnesota Plant Press

The Minnesota Native Plant Society
Newsletter

Volume 13, No. 3 **Spring 1994**

Upcoming Monthly Meetings

335 Borlaug Hall—7:30-9 PM
St. Paul Campus

April 6.
Scott Zager—DNR County Biological Survey:*Plant Geography of the Minnesota Blufflands.*
Plant-of-the-Month: Douglas Owens-Pike, bearberry (*Arctostaphylos uvi-ursi).*
Board Meeting: 6 PM, Student Center.

May 4.
Photo contest show (see page 3, column 1 for details); plant sale.
Board Meeting: 6 PM, Student Center.

Spring and Summer Field Trips
See page 2 for schedules.

September 15
Deadline for Fall Newsletter

October 5
Start of the Next Season. Mark your calendar now.

Location change for 1994-95

The Board is negotiating for a change in location of MNPS meetings starting in October 1994 and into 1995. Central location with ample parking space, and little or no rental fees for space are considerations, among the options. Watch for a letter from the Board announcing the decision and the reasons for it.

Save Cedar Lake Park

A citizens' group that has made a difference
by Laurie Lundy

Little did the handful of neighbors that gathered in March of 1989 realize how quickly their vision for preserving a parcel of open space near downtown would come true.

In the shadow of Minneapolis skyscrapers, former railroad land is reverting to nature. Several foxes raised their kits, three pairs of bluebirds produced 17 young last summer, and ospreys were reintroduced into the new Cedar Lake Park. Many other species of birds and waterfowl, wildlife, trees, grasses, and wildflowers inhabit the area

Citizen Group formed.—Early in 1989, the railroad posted "For Sale" signs on the former railroad switching yards on the northern edge of Cedar Lake in Minneapolis. And, a tiny group of neighbors started talking to anyone who would listen to ways of preserving this open space. They called a larger meeting in which 65 concerned citizens met to decide that the best way would be to preserve and develop the area into an urban nature park. They created a citizens' group—*Save Cedar Lake Park* (SCLP)—to lead the effort to preserve the woodlands and meadows that lie to the north and northeast in St. Louis Park. The area would add a 48-acre nature park to the Regional Chain of Lakes Park and provide an essential link to downtown, the new Riverfront Regional Park, and the western suburbs.

continued on page 5

The *Save Cedar Lake Park* story reprinted here gives conservationists a look-behind the successful birth of a new metropolitan park and natural area.

In early February, the *Minnesota Native Plant Society* Board received a request for support and help from a group that had been working on the project since 1989 on a major metropolitan conservation project that included a key role for Minnesota native forbs and grasses.

Because the *Save Cedar Lake Park* citizens' group was so successful in gaining support for Cedar Lake Park they were rapidly approaching a time when knowledge and expertise about native plants, prairies, seed and planting advice, and even donated native plants, could be a part of the volunteer help needed.

MNPS members interested in volunteering for this project can use the return form (page 7) or phone number to indicate interest in participation as a volunteer.—*Chase Cornelius*

MNPS Field Trips

Spring

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Optional equipment for all three trips include cameras, binoculars, hand lens, and field guides.

No fees are required except daily or annual parking permits.

—Nancy Albrecht

Large clumps of 20 or more stems of showy lady's-slipper (*Cypripedium reginae*) seen in cedar swamps may be 100 years old or older, if rhizomes are undisturbed—W.R. Smith, 1993, *Orchids of Minnesota*.

Summer

1) **GOOSE LAKE PRAIRIE WALK.** Pennington County, July 9, 1994, 9 AM to 3 PM. Joint with *Nature Conservancy*—a 3-4 mile hike. Marsh remnants surrounded by prairie types between two Lake Agassiz beach ridges. Bring bag lunch. Fred Harris (ecologist) and Steve Stucker (ornithologist) are leaders. Meet in front of Hardees in Thief River Falls, on north side of Hwy 59 at west end of city.

2) **"PRAIRIE SMOKE" Prairie Tour.** July 16, 1994. Join Deborah Anderson and Susan Gossman on a tour of 2 prairies near Chatfield, 20 miles south of Rochester on US Hwy 52. Meet at Chatfield City Park at 10 AM. Carpool to Tuohy Prairie at town's edge, eat a picnic lunch (your own), and go to Kark Prairie, 4 miles from Chatfield. *Reservations are requested by July 10.* Call . or write Timothy Gossman,

3) **REDISCOVER THE URBAN PRAIRIE.** Twin Cities, Saturday, July 23, 10 AM to 3 PM. Bob Jacobson (MnDOT) and Dave Olfelt (MnDNR) will lead caravan to little-known prairies along the Mississippi and Minnesota Rivers in the metro area. *Reservations required.* Call Dave at for map, directions and other details. Bring lunch.

4) **GULLY FENS.** Polk County, July 30, 1994, 10 AM. Gully is near Bemidji, 1.5 hr drive from Itasca Park. Joint with *Nature Conservancy*. Gully Fen is a mixture of prairie and boreal forest fen species. A 2.5 to 4-mile hike. Nancy Sather (botanist/ecologist) is the leader. Take Hwy 92 north from Bagley. Gully is 1/4 mile north of 92 on Polk County #2. Meet at "Gully Mall"—old elementary school on south side of Gully. Bring lunch. No trails, no facilities; rough terrain, some wading—*Be prepared!*

5) **Minnesota Prairie Day**, site undecided, Saturday, August 13 (date tentative) *(go to page 7)*

The Minnesota Native Plant Society

Minnesota Plant Press
Thor Kommedahl, editor

Newsletter of the
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News and Announcements

Designing Gardens with Native Plants—A Seminar

This seminar will be led by Cole Burrill at Maplewood Nature Center on April 26, May 3 and 10, 1994, from 7 to 9 PM.

Participants will become familiar with the variety of colors and textures of native wildflowers, ferns, and woody plants, and will create garden designs for their own yards. Native plant gardens attract butterflies, birds, and other wildlife to the yard.

For details consult Maplewood Nature Center, 2659 E. 7th Street, Maplewood, MN 55119, or call 612/738-9383.

Botany photography exhibition is set for May 4 and May 18

The *Minnesota Botany International* is an exhibition on photography of flowering plants, fungi, lichens, ferns, habitats and fossil plant life, and is sponsored by the Minnesota Nature Photography Club. The exhibition will be held Wednesday, May 4, 1994, 7:30 PM in Borlaug Hall, University of Minnesota, St. Paul, at the MNPS May meeting, and on Wednesday May 18, 1994, at 6:30 PM at the Minnesota Nature Photography Club, MN Valley National Wildlife Refuge, 3815 E. 80th St., Bloomington, MN.

The closing date for entries is April 20, 1994. The entry fee for four slides is $4.50. Call or write Terry or Kathleen Schuller for an entry form or send slides, entry fee, and a note with your name, address and slide titles, to Minnesota Botany, 10632 Upton Avenue S., Bloomington, MN 55431.

MNPS 1993 treasurer's report

The checking account on 1 January 1993 was $3,254.84, and on 31 December 1993 was $3,619.95. Income was $5,163.49 (mainly memberships and donations), and expenses were $4,798.38. MNPS has CDs worth $2,500.—*Ruth Phipps, treasurer*

Growing Native Flowers at Home—A Symposium

"Growing Native"—a public symposium on how, where, when, and why to grow native plants in the home yard—will be held on Saturday, April 30, 1994, from 8:30 AM to 3:30 PM.

Sponsored by Hennepin Parks and the Minnesota Native Plant Society, this public program will take place at Crow-Hassan Park Reserve, at the Hennepin Parks Nursery.

The cost to attend this all-day event is $20 per person. This fee includes program, hand-outs, lunch, parking, a mixed prairie seed packet, and a wildflower seedling. A student discount is available.

Program topics that will be addressed include the importance of native plant biodiversity to humans and wildlife; where and how native wildflowers live and grow, habitat requirements, range, season of bloom, and pollination strategies; and, propagating and growing wildflowers at home—seed and plant material sources, growing requirements, how to plant, which types of plants are easiest to grow—and how to plan a native garden for your own yard.

There will be tours of the Hennepin Parks Nursery and wildflower plantings and displays from native plant businesses and organizations on the beauty of native wildflowers.

To make reservations, or for details, call Hennepin Parks at (612) 559-9000 or 476-4663.

The program is as follows:

8:00 Registration
8:30 Introduction (Welcome)
9:00 to noon Hands-on sessions on propagating native plants (Lois Larson), soil (Bob Mughas), tour of nursery (Tom Jahnke).
12:00 Lunch (buffet)
1:00 Natural History of Native Plants (Welby Smith)
1:40 Planning Native Plant Home Landscape (Diane Hilscher)
2:10 Break
2:20 Native Plant Controversies:Panel (Lisa Mueller, Karl Ruser, Becky Schirber).
3:00-3:30 Wrap-up/resources

Please renew your membership in Minnesota Native Plant Society now

There is still time to renew your membership and receive the MNPS Newsletter. Your continued support is important in the effort to build awareness of our Minnesota native plants and to let people know about the Society and the work it does to foster interest in our native species.

The year your membership is paid *through* is typed on your address label on the Newsletter. You can renew your membership today by mailing your check to MNPS. Membership fees and the mailing address are given in the box on page 2, column 3. Or, you can renew your membership at the next monthly meeting.

The **Minnesota Native Plant Society** appreciates your membership support and your participation.

Display Board of MNPS

All members are welcome to show our display board at events, museums, and schools, if there is an attendant present or it is safely displayed. With infomation on the Society, native plants, and stewardship, the two-sided board is 3 by 5 feet. Call Don Knutson

A hold on scientific names

A resolution adopted at the 15th International Botanical Congress in 1993 in Yokohama, Japan, mandates taxonomists not to disrupt established names, not to resurrect long-forgotten names, and not to change the application of names, at least until the 1999 meeting, reports D.L. Hawksworth of the International Mycological Institute, Egham, England. *(Syst. Ascomycetum 12[1-2]:1-6, 1993).*

Mushrooms in Minnesota Old-Growth Forests

Our study of mushrooms in Minnesota old-growth forests began last summer. A major motivation was to obtain baseline data on mushrooms that grow in our old-growth forests so that data can be used to monitor forest health and environmental change. Equally important is to understand the biodiversity of mushrooms in Minnesota, and the nature of forest fungi before forests were extensively altered by humans. To understand the significance of the study we need to appreciate the roles of the macrofungi or mushrooms, the loss of mushroom species in Europe and its implications for North America, and the state of knowledge of mushrooms in Minnesota.

Macrofungi have important roles in forest ecosystems. Some are saprobes important in recycling wood and litter, some are parasites, and many are mycorrhizal. We focused our attention on mycorrhizal fungi because it was too large a task to study all mushrooms of the forest and because loss of these fungi in Europe preceded decline in the health of the forest. Many of these fungi are susceptible to ecosystem disturbance.

Dramatic declines in mushrooms in Europe in the last 20 years is attributed to air pollution, especially accumulation of nitrogen in forest soils and acidification. Red data lists exist for threatened and endangered mushrooms in many European countries. This decline in mushrooms in Europe is a warning that we need to understand the situation in Minnesota and what constitutes an unaltered forest ecosystem.

It is generally assumed that because we know a fair amount about numbers and distributions of vascular plants, the same is true for other plants and fungi. In fact, our knowledge of mushroom species and their distributions is poor for North America. In Minnesota, our records show about 1,000 species of macrofungi; however, areas in Europe of comparable size to Minnesota contain 2-3 times this many species. There is also a correlation between diversity of vascular plants and numbers of fungi. Our flora is more diverse than areas of comparable size in Europe, and we estimate the number of species in Minnesota to be greater than 3,000. Only the central and eastern parts of the state have been studied extensively and documented for mushrooms.

There are no data for numbers and kinds of mushrooms on old-growth forests in North America, but two studies are in progress in the Pacific Northwest. Two types of fungal inventories are useful: intensive monitoring of plots for species composition and abundance, and general surveys (occasional visits in fruiting weather). The latter provides an incomplete view of fungi present and are not quantitative. Monitoring plots gives more complete data and is used in Europe to get data useful in assessing environmental change.

We anticipated a moderate number of mycorrhizal fungi in the old-growth forests, based on studies of second-growth forests. Our findings were different. Four sites were studied (1 and 2 were quantitative, 3 and 4 were qualitative): 1) Scenic State Park of old-growth red pine; 2) Tettegouche State Park, a northern hardwood-conifer forest; 3) Superior National Forest of white pine; and 4) Townsend Woods Scientific and Natural Area, a maple-basswood forest. Two plot designs were used to gather data. *(continued on page 7)*

Summary of February Meeting Presentation at MNPS by Professor David J. McLaughlin and graduate student Patrick R. Leacock, of the University of Minnesota's Plant Biology Department, St. Paul Campus.

The Geology and Flora of Fens

Fens are an unusual type of wetland characterized by an organic soil (muck or peat), infiltrated by groundwater and home to many plant species, some found only in fens. Fens are of two basic types: rich and poor—classification varies among ecologists. Poor fens are acidic (pH<6.5), are nutrient poor (little calcium, magnesium, etc.), have weakly mineratrophic plants (grow in nutrient poor conditions), and have considerable *Sphagnum* moss; bogs are actually poor fens. True bogs are raised above the water table. Rich fens have a pH above 6.5, are nutrient rich, have minerotrophic species with fair to no amounts of *Sphagnum*.

Fens, like prairies, were maintained by fire, which helped keep willows (*Salix* spp.), dogwoods (*Cornus* spp.), bog birch (*Betula pumila*), red elm (*Ulmus rubra*), and other woody plants in check. Fire suppression has allowed trees and shrubs to take over some sites. Many fens have been lost to tiling of land for agriculture. Gravel mining, herbicides, and grazing are also threats. Ironically, many fens are extant because they occur in pastures, though the quality varies with the intensity of grazing.

Fens are dominated by sedges and grasses. In spring, fens show the cottony flowers of cotton sedge (*Eriophorum angustifolium*), the yellow blossoms of monkey flower (*Mimulus glabratus*), and the ornate white flowers of bogbean (*Menyanthes trifoliata*). Early to midsummer one finds the northern bog orchid and green twayblade, the yellow flowers of carnivorous small bladderwort (*Utricularia minor*), and the cyanide-producing arrow grasses (*Triglochin palustris*). Late summer to fall finds beak rush (*Rhynchospora capillacea*) and small nutrush (*Scleria verticillata*). *(continued on page 7)*

Summary of January Meeting Presentation by Mark Loeschke, botanist, Rust Environment and Infrastructure.

Continued from page 1

Membership in SCLP grew rapidly. Committees sought donations, produced and sold T-shirts, wrote newspaper articles, prepared trail maps and other visuals, arranged tours, and attended endless meetings. Then some of the citizens approached the Minneapolis Park and Recreation Board which resulted in a citizens' committee studying the idea of a nature park with connecting trails.

Guidelines developed.—From early on, the group lived by a number of organizational guidelines. Some examples follow:

- •Create a vision. Be bold. Base the vision on values and need. Be positive. Be for something rather than against something.
- •Communicate the vision, the values, and the need. Communicate the message over and over, over and over, never stop.

Keeping these guidelines in mind, SCLP members attended a November (1989) public hearing of the Metropolitan Council Open Space Commission where many citizens and community leaders supported the project.

Fund raising efforts.—After that, *Save Cedar Lake Park* shifted into high gear. In January 1990, the group decided to raise acquisition money, and that summer, by consensus, the group agreed to privately raise one-third of the purchase price.

Over the winter, work continued on developing a broad base coalition of metro-area neighborhoods, legislators, and government agencies and organizations.

When the land owner began to actively market the property in March 1991, the citizens began a successful effort to educate state legislators. At the same time, the Minneapolis Chapter of the Audubon Society pledged their entire bird sanctuary fund to SCLP. The "birders" felt that Cedar Lake Park was the closest they would get to having a bird sanctuary close to downtown Minneapolis; they also wanted to show legislators how committed they were to saving this parcel of open space. By the end of the 1991 session, the Legislature, sensing the urgency and fearing loss of this valuable acquisition, approved the additional funding needed to purchase Cedar Lake Park in the cities of Minneapolis and St. Louis Park.

Land purchased.—As a result, fund raising efforts increased. In 23 months, the citizens raised nearly a half million dollars in cash and pledges. To purchase the property before the year's end, the James Ford Bell Foundation provided a grant and interest-free interim financing. And, because regional parks within Minneapolis are operated and maintained by the city, the Park Board purchased the land on 25 November 1992, with the private and public money the SCLP group had generated.

Further, the group was instrumental in negotiating a joint use/lease arrangement between Hennepin County Regional Rail Authority and the Minneapolis Park Board to add to the parkland 60 additional acres of adjoining Hennepin County land on the east side of Cedar Lake.

Organization and planning.—In February 1992, the Cedar Lake group and the Park Board formed an informal partnership. To achieve trail linkages between downtown and the new Riverfront Regional Park, Wirth Park, Bassett's Creek, and the western suburbs, the partnership submitted a grant proposal to the Legislative Commission on Minnesota Resources. The commission approved the proposal requesting funding for phase 1 of the trail development between Highway 100 in St. Louis Park and the Mississippi River in downtown Minneapolis, contingent on a substantial private match of funds, which the group had raised.

Shortly after that, a planning committee, including citizens and Park Board staff, met weekly to develop design criteria for preserving open space.

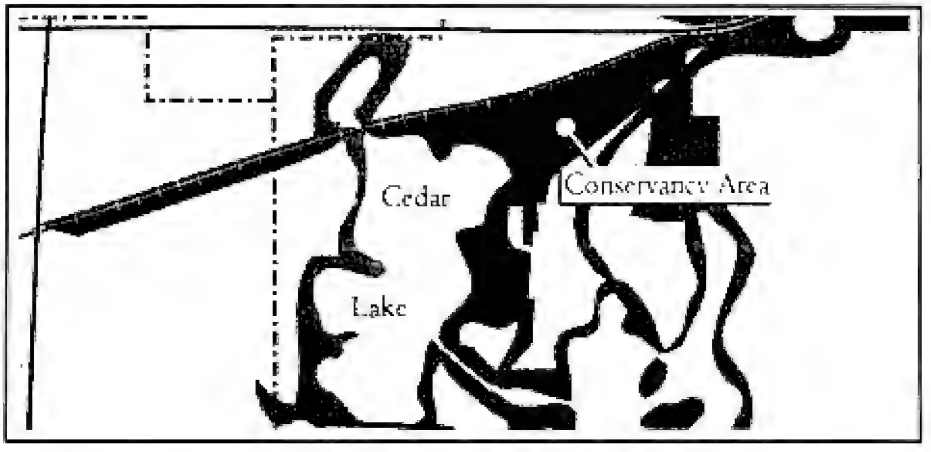
Meanwhile, federal money, with a local fund match, became available through the Intermodal Surface Transportation Efficiency Act. A small portion of that money is available for alternative transportation such as bicycle and pedestrian facilities. The Minneapolis Public Works joined the SCLP and Park Board partnership because they would ultimately be involved in trail construction. Thus, the three entities became the Cedar Lake Park and Trail Partnership.

Design and construction.—In 1993, the selection committee, consisting of representatives from SCLP, The Minneapolis Park and Recreation Board, and the Department of Public Works, interviewed four teams of designers and selected Jones & Jones/Richard Haag Associates to work with a local engineering firm. The contract was submitted and approved by the Park Board.

The first phase of construction in 1994 will be to create biking, jogging, and walking trails from the Cedar Lake road to 7th Street. At the same time parts of the north meadow will be developed into a prairie area.

Laurie Lundy is the Save Cedar Lake Park project coordinator. For more information, contact SCLP (612) 377-9522.

The original article *Save Cedar Lake Park* was printed in *Minnesota Cities* and has been condensed for the *Minnesota Plant Press* with approval of the author.



The ENDANGERED SPECIES ACT of 1973 will be amended in 1994

December 28, 1993, marked the 20th anniversary of the Endangered Species Act (ESA). The preamble to that Act stated that endangered species of fish, wildlife, and plants "are of esthetic, ecological, historical, recreational, and scientific value to the Nation and its people."

Amendments to this Act are included in the "Endangered Species Act Amendments of 1993" (H.R. 2043) which was not taken up last year but will be reintroduced in the new Congress, probably in April 1994.

Representatives Gerry Studds (D-MA), John Dingell (D-MI), and Jim Saxton (R-NJ) have introduced this bipartisan bill to strengthen and reauthorize the ESA.

The bill requires agencies to inventory candidate species on their lands, identify conservation measures which reduce the likelihood that species would need listing in the future, and authorizes agencies to enter into voluntary agreements with the Interior Secretary to conserve those species. Also, H.R. 2043 authorizes a study of federal laws and programs that are harmful to listed species or discourage conservation by private landowners.

Methods of implementation of the bill are included as well as strategies for funding and getting cooperation.

Instead of a species-by-species focus, this bill uses a more fiscally and ecologically sound ecosystem approach.

Plant and animal protection compared.—Under the Endangered Species Act, threatened or endangered plant species receive less protection than animal species on non-federal lands. The Act contains a provision that forbids killing, injuring, or harassing a listed animal or destroying its habitat. Plants, however, are protected on non-federal lands only by state laws, and 24 states have no laws to protect endangered species. *(AIBS Forum 12[4]:2, 1993)*

Endangered and threatened wildlife and plants listed.—Updated lists of federally listed threatened and endangered species and federal candidate plant species were published in September, 1993. This is a 40-page booklet listing all animal and plant species protected by the Endangered Species Act, and includes plants being considered for listing. Request copies from Zella E. Ellshoff, Botanist, Division of Endangered Species, US Fish and Wildlife Service, 1 Federal Drive, Fort Snelling, Minnesota 55111; telephone 612/725-3276.

Medicinal uses of plants has bearing on endangered species.—One-third of all pharmaceutical prescriptions are based on substances derived from plants or synthesized in imitation reports Dr. Thomas Eisner, Director of the Cornell Institute for Research and Chemical Ecology, at a Congressional hearing on the Endangered Species Act. He also noted that as technological capabilities increase in the future, more beneficial chemicals may be discovered. The hearings were sponsored by a House Merchant Marine Subcommittee on Environment and Natural Resources, chaired by Gerry Studds (MA). *(AIBS Forum 12[4]:1, 1993.)*

Global considerations of the bill.—Internationally, H.R. 2043 improves implementation of the Convention on International Trade in Endangered Species (CITES) by clarifying that federal agencies are authorized to issue appropriate regulations to implement CITES to stem illegal trade in endangered species.

Congressional support for H.R. 2043.—As of September 1993, 93 Representatives and 15 Senators in Congress have signed as cosponsors, according to the Minnesota Audubon Council. Minnesota cosponsors include Representatives Collin Peterson, Martin Sabo, and Bruce Vento and Senators David Durenberger and Paul Wellstone (S 921 is the Senate bill).

—Rick Jannett collected and contributed materials for these two columns.

From the Cedar Lake Park & Trails Statement of Philosophy

(see pages 1 and 5)

RECONSTITUTE a variety of native plant communities which reflect lake, wetland, prairie, savannah, woodland and forest ecosystems.

•Convert and maintain the large open expanse to the north and northeast of Cedar Lake primarily as oak savannah (native grasses, flowers, and scattered oak trees).

•Manage the upland areas currently containing mature oak trees primarily as oak woodlands with prairie openings.

•Enhance and expand the wetland communities along the lakeshore particularly in those locations where storm water runoff is most likely to occur.

•Reestablish/establish additional wetlands (ephemeral ponds, wet meadows, marshes and/or streams), based upon historic evidence and the suitability of the topography and soils to the extent possible.

•Plant red cedar trees as individuals or in small groupings in the drier portions of the park and along the commuter trail corridor(s).

•Plant white cedar and tamarack trees near the lakeshore.

Conservation Committee of MNPS elects Bristow chair

At a meeting called by Rick Jannett at the Science Museum, in St. Paul, on 17 February 1994, Charles Bristow was elected chair. The Committee discussed several areas of interest including the reauthorization of the *Endangered Species Act* (see columns 1 and 2 on this page). The next meeting will be Thursday March 17 at 7 PM. For more information, call Charles Bristow .

(Mushrooms ...continued from page 4)
Data were collected so as to adequately document the species. There are no general keys for mushrooms of eastern North America, so that final identification required microscopic examination and extensive analysis of the literature.

Pat Leacock presented information on field plots and showed slides of many mushrooms found at Scenic and Tettegouche State Parks in August and September 1993. At Scenic State Park, *Laccaria laccata* var. *pallidifolia* was the most frequent species, and the only one found at all four sites. The most important genera in species diversity were *Cortinarius* (Cortinariaceae) and *Russula* and *Lactarius* (Russulaceae) with 15-18 species in each genus. At Tettegouche State Park, *Clavulinopsis fusiforme* and *Hygrocybe caniharella* were the most frequent species and the Hygrophoraceae and Entolomataceae were the most important families, each with 15 or more species.

We anticipated finding 25 to 50 mycorrhizal species, but we found 99 mycorrhizal species in the red pine forest and 71 in the northern hardwood-conifer forest. Neither study is complete. Some species could not be documented adequately with the small amount of material available and no site was completely sampled throughout the fruiting season. In the four sites, 192 species were found, with 26 of these species shared between sites and only one species occurring in all four sites. We expect that 75-100 of these species will be new state records. In 1994, we plan to sample each site to get a full season of data, and to compare mature and old-growth forests. Old-growth forests in the state appear to have a high diversity of fungi similar to that reported in the Pacific Northwest. Old managed plantations in Europe apparently have low diversity, suggesting the need to maintain tracts of undisturbed forests for future generations.

Geology and Flora of Fens

(continued from page 4)

A fen's best show is in fall, with the creamy flowers of grass-of-Parnassus (*Parnassia glauca*), the purple-blue and white of Kalm's lobelia (*Lobelia kalmii*) and the exquisite blue of fringed and lesser gentians (*Gentianopsis crinita* and *G. procera*).

Field Trips

(continued from page 2)

Call DNR for details: 296-6157, or 1-800-766-6000.

6) **Savage Fen Wetland Complex**, Savage, MN, Saturday, August 27, 10 AM to 2 PM. Led by Steve Eggers (Corps of Engineers) to 112-acre parcel of land newly acquired by USFWS. There are 45 acres of calcareous fen with 7 state-listed plant species. Compare management with adjacent 26-acre site intensively managed since 1986. Small mesic prairie also. Call Steve Eggers for directions and map.

For all trips, be prepared for rain, mud, and insects; bring lunch, field guides, lenses, binoculars, as usual. Check on reservations. Enjoy!

—Nancy Albrecht and B.J. Farley

Prairie Smoke—organized to restore and maintain prairies

In March 1993, 30 people in southeastern Minnesota organized to study, restore and maintain prairies, and named the organization *Prairie Smoke*, after the wildflower and to symbolize fire as a means to revitalize remnant prairies.

Activities in 1993 included planting a native wildflower butterfly garden, burning some lands, preparing a video of native plants for donation to the Chatfield Public Library, preparing a third-acre site for seed production for planting prairies, encouraging the Fillmore County Highway Department to seed a 3-mile road improvement project with native grasses and wildflowers, and organizing field trips to prairies during the season.

A "burn wagon" will be constructed for use in controlled burns this summer. This will be a 2-wheeled trailer holding a water tank, pump, hose and burn equipment such as backpack pump cans, swatters and rakes.

Pasque flowers bloom here in spring, small purple fringed orchids in summer, and bottle gentians in fall, as examples of local prairie flora.

A field trip with MNPS is planned for July 16, 1994, see page 2, col. 2.

—Timothy M. Gossman

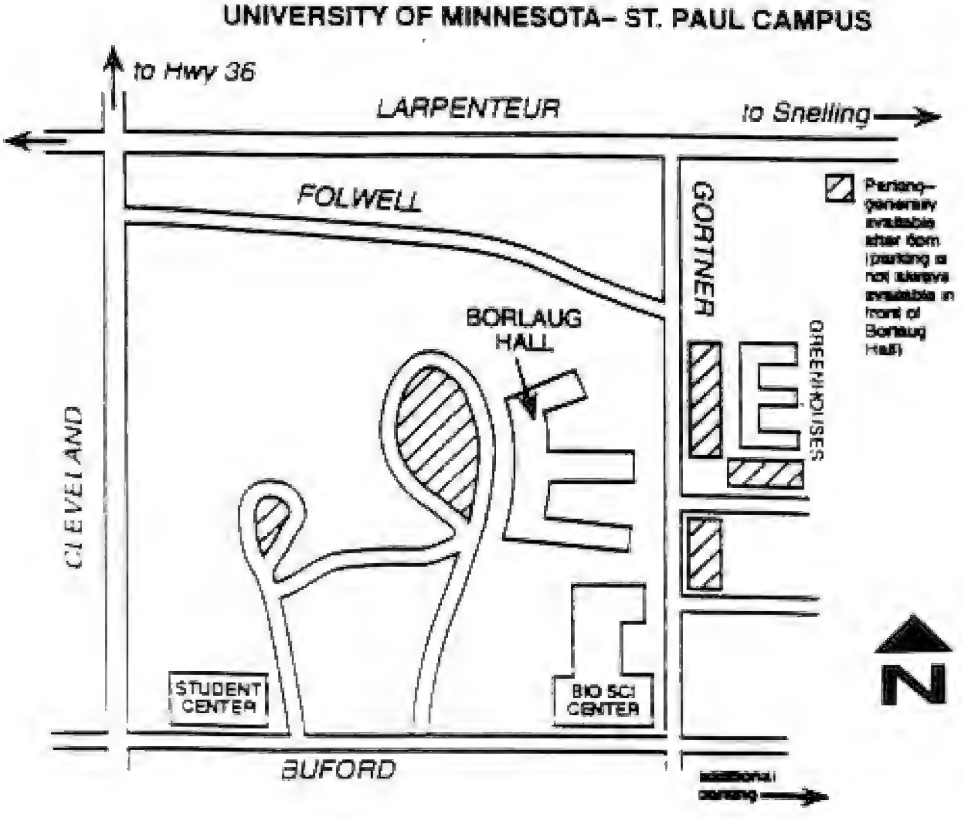
To Volunteer for the SCLP project, fill out this form and mail it to

Name_____Phone_____
Mailing address_____
_____
_____

I am interested in learning more about how to help as a volunteer:
- •I would like to work with native plants___
- •I have experience in selecting native plants for specific sites _
- •I would like to donate Minnesota native plants I have grown__
- •I am particularly interested in_____
_____
_____
_____

Minnesota Native Plant Society
University of Minnesota
220 Biological Sciences Center
St. Paul MN 55108

Minnesota Native Plant Society



Minnesota Plant Press

The Minnesota Native Plant Society
Newsletter

Volume 13, No. 4 **Summer 1994**

Upcoming Monthly Meetings

Minnesota Valley National Wildlife Refuge
Visitor Center, 3815 East 80th Street
Bloomington, MN 55425-1600
612-335-2323

July 10 Retreat for Board of Directors, 1-5 PM, at Minnesota Valley National Wildlife Refuge; Box lunches available.

Summer Field Trips (details on page 4)
July 9: Goose Lake Prairie Walk
July 16: Prairie Smoke Tour
July 23: Urban Prairie
July 30: Gully Fens
August 13: Minnesota Prairie Day
August 27: Savage Fen Wetlands

September 15
Deadline for Fall Newsletter

October 5—First Fall Meeting
David Tillman, UM Professor of Ecology,
Prairie Biodiversity: Causes and Value
Board Meeting: 5:30 PM
Social Meeting: 6:30-7 PM
Regular meeting: 7-9 PM

New Location for October 5 meeting, and all year, at **Minnesota Valley National Wildlife Refuge** (see address above and map on back page).There is ample parking, but limited bus service. Grace Gray will organize car pooling from St. Paul Campus (484-0190).See Becky's letter on page 3

Plant Geography of Southeast Minnesota

Scott C. Zager

The Paleozoic Plateau is a landform region in southwest Minnesota defined mainly by its geology. This plateau, also known as the Blufflands, is a rugged landscape dominated by bedrock exposures of dolomitic limestone, sandstone, and shale. These sedimentary rocks were deposited by ancient seas during the Cambrian and Ordovician ages of the Paleozoic Era. The Quaternary Period or "Great Ice Age" culminated a trend toward climatic cooling with a series of at least 20 glacial-interglacial periods. The Paleozoic Plateau in Minnesota and Iowa has been called the "driftless area" because it was thought to be unglaciated during the pleistocene; however, recent evidence suggests that the area was repeatedly glaciated more than 500,000 years ago during which time the Mississippi River evolved (Hallberg et al. 1984). After the glaciers receded, a dendritic network of waterways eroded steep valleys into the bedrock leaving narrow bluffs whose mesa-like crests rise 600 feet above the floodplain of the Mississippi River. Much of the down-cutting probably occurred between 160-20k (k=thousand) years ago and by 10k the Mississippi River was at its present elevation. The young age of the landscape is supported by an almost notable lack of a unique taxa in the region's flora. The relatively few, truly endemic taxa suggests that there has been a limited period of time for species and subspecific evolution.

The origin of extant vascular plant genera and of many species occurred largely prior to the Quaternary. This era is characterized more by changes in distributions of plant taxa and floristic composition of plant communities than by the evolution of genera and species. In the last 20k years the Paleozoic Plateau has been transformed from periglacial tundra to the present day temperate climate. At present, the Paleozoic Plateau is at the interface of three major biomes: Eastern Deciduous Forest, Great Plains Prairies, and Boreal Forest. The demarcation of these boundaries has never been clear and has fluctuated widely across North America during several climatic shifts in the last 10k years. During the hot and dry periods, the tallgrass prairie *(continued on page 2, Plant Geography)*

Plant Geography *(from page 1)*

extended to the eastern seaboard, whereas in cool and moist periods, deciduous forest probably covered all of southern Minnesota. Circumboreal species have survived since the Wisconsin glaciation on north-facing, algific talus slopes whose cold micro-climate is maintained by ice caves.

The Paleozoic Plateau is Minnesota's most biologically diverse region. The six Minnesota counties bordering the Mississippi River cover about 4% of the state's total surface area, yet 14% of all the rare feature records of the Natural Heritage Information System (NHIS) occur in these six counties. The distributions of the rare species found in the region indicate the complex natural history of the region. Many of these species are on the periphery of their range. Some represent disjunct populations far from where the species is typically found. Other species are rare because they require specific habitats which were never common or whose habitat is now diminished because it has been largely converted to human uses. A few species are rare because of reasons not yet understood but have probably always existed in low numbers. At least one species, dwarf trout lily (*Erythronium propullans*), is endemic and probably evolved here. Finally several species are rare because of some combination of the above factors.

The natural communities found within the dissected topography of the Paleozoic Plateau harbor some of Minnesota's rarest plant and animal species. Since 1990, the Minnesota County Biological Survey (MCBS) has been collecting biological information on the distribution and status of rare animals, rare plants, and natural communities within the Paleozoic Plateau. The MCBS was established in recognition of the need to assess the status of the state's biological diversity and its unique natural resources. It is a county-by-county survey housed within the Minnesota Department of Natural Resources (MN DNR), Division of Fish and Wildlife, Section of Wildlife. The fundamental objective of the MCBS is to systematically identify locations of Minnesota's natural areas, their component natural communities and rare species. Location information and associated ecological data on all natural areas, natural communities and rare species are entered into the NHIS. Natural area and community boundaries are digitized into an ARC/INFO GIS, and all point locations of rare species are digitally recorded as geographic coordinates. Information from the NHIS Rare Features Database is available as printed abstracts describing the characteristics of each rare feature location, e.g., observer, date of information, number of plants, eggs per nest, condition of prairie due to grazing, etc.

A summary of a presentation made at the 6 April 1994 meeting of the Minnesota Native Plant Society, by Scott C. Zager, of the Minnesota DNR County Biological Survey.

PROPOSED GUIDELINES

MNPS Conservation Committee Report

Organization

The Conservation Committee shall consist of members of MNPS interested in pursuing the goals set forth in the Mission Statement. A chair shall be elected by majority vote taken at a scheduled meeting. The term of service shall be 1 year. The committee shall meet monthly throughout the year, but extra meetings can be called when needed.

Communication with MNPS Board

Communication with the Board of the MNPS shall be maintained through a Board liaison, to be selected by the Board. Actions taken by the Committee shall be subject to Board approval.

Mission Statement

The Conservation Committee shall: 1) Provide information to Society members on issues relating to conservation, including but not limited to, promotion of the use of native plant species; preservation of native plant species and communities; and conservation of rare and endangered species, 2) Advise the Society's Board of Directors on what action should be taken regarding conservation issues, and 3) Undertake those actions deemed appropriate by the Society's Board of Directors.

Response: Contact Bristow with changes or ideas about this Committee.

—Charles Bristow, Chair, 3/1/94

The Minnesota Native Plant Society

Minnesota Plant Press
Thor Kommedahl, editor
University of Minnesota, 495 Borlaug Hall, St. Paul, MN 55108;

Newsletter of the
Minnesota Native Plant Society

Membership dues are $10 per year for regular members and includes subscription to the newsletter; dues for students and seniors are $8, for family $12, for institutions $20, and donors $25. Checks can be made out to: Minnesota Native Plant Society, and sent to : Minnesota Native Plant Society, 220 Biological Sciences Center, 1445 Gortner Avenue, St. Paul, MN 55108.

Four issues are published each year.

The Minnesota Native Plant Society is a tax-exempt 501 c3 organization as determined by the US Internal Revenue Service.

President Becky Schirber announces meeting location at National Wildlife Refuge Center

Dear Members:

The *Minnesota Native Plant Society* has been meeting on the St. Paul Campus of the University of Minnesota for many years, but, starting October 5, 1994, we will be changing our meeting location to the Minnesota Valley National Wildlife Refuge Visitor and Education Center. Much thought and consideration went into the decision concerning this change. Some of the issues that were considered are outlined below.

The somewhat central location of the St. Paul Campus and the especially easy access for students and workers on the campus were advantages of meeting in Borlaug Hall on the campus. However, the disadvantages of meeting on campus continued to mount. If we were to continue to meet on campus we would have to schedule meetings at the beginning of each quarter for any campus room. Borlaug Hall has become increasingly popular for meetings, and school functions take priority. Parking has become a major obstacle for many members and for potential members. Our meeting place is seen as difficult to find, considering the maze of streets and the many parking restrictions. Many people also consider it unsafe to walk to their cars at night in winter. The parking problem has been brought up for years and some members have let us know that they have not attended meetings because of inconvenient parking and often extensive walking when meeting on the St. Paul Campus.

In December 1993, when the MNPS Board found out that there was a conflict with a class scheduled in Borlaug Hall, the Board decided to look for alternative sites. Moving the location of our general and board meetings was much debated and carefully considered. The locations considered included the Minnesota Horticultural Society building, the Minnesota Valley National Wildlife Refuge Visitor and Education Center, the Earle Brown Center, the Bell Museum, and other campus buildings as well as places on other campuses, e.g., University of St. Thomas, Macalester College, and Hamline University.

We found barriers (pay parking, high room fees, small facilities, scheduling difficulties, and safety) to using any of these locations except for the Minnesota Valley National Wildlife Refuge.

The following advantages to locating our meetings at the Minnesota Valley National Wildlife Refuge are as follows:

- It is a first class facility
  - –The auditorium holds 120 people, has slanted floors, and comfortable seats
  - –The audio-visual equipment is state-of-the-art
  - –Accommodations exist for the hearing impaired
- Parking is ample, adjacent to building, well lighted for safe walking
- Natural setting for walking paths to the Refuge
- The mission of the Refuge is similar to ours
- The Refuge has a large mailing list and we will be on their monthly calendar
- Location between Minneapolis and St. Paul, just south of airport, easily accessible from major roads and freeways
- Public transit, but limited; car pooling possible

This was an important decision for us to make. The Board gave it much thoughtful consideration and placed it on the meeting agenda at the March general meeting. Now that we have made the decision to move, we think this is an excellent opportunity to make this our permanent home for MNPS. We appreciate all of your support in making this transition a smooth one. Grace Gray has volunteered to help organize car pooling from the St. Paul Campus. Her phone number is 484-0190. She is a busy person so keep trying to reach her. John and Jackie Buffalow have agreed to head up the refreshment committee for the coming season. Diane Hilscher has been working hard and successfully in planning next year's program. I am looking forward to another great year for the MNPS. See you in the fall at the Minnesota Valley National Wildlife Refuge!

–Rebecca Schirber, President MNPS

Future meetings of MNPS will be held at the

Minnesota Valley National Wildlife Refuge Visitor and Education Center

3815 80th Street, Bloomington, Minnesota

Meetings: First Wednesday of each month
Board meetings from 5:30 to 6:30 PM in Classroom B
Refreshments and Social Time 6:30 to 7 PM in Classroom A
General Meeting 7 to 9 PM in Main Auditorium

MNPS will continue to keep the same mailing address and relationship with the University of Minnesota, Department of Plant Biology.

News and Announcements

Summer Field Trips

1) **GOOSE LAKE PRAIRIE WALK.** Pennington County, July 9, 1994, 9 AM to 3 PM. Joint with *Nature Conservancy*—a 3-4 mile hike. Marsh remnants surrounded by prairie types between two Lake Agassiz beach ridges. Bring bag lunch. Fred Harris (ecologist) and Steve Stucker (ornithologist) are leaders. Meet in front of Hardee's in Thief River Falls, on north side of Hwy 59 at west end of city.

2) **"PRAIRIE SMOKE" Prairie Tour.** July 16, 1994. Join Deborah Anderson and Susan Gossman on a tour of 2 prairies near Chatfield, 20 miles south of Rochester on US Hwy 52. Meet at Chatfield City Park at 10 AM. Carpool to Tuohy Prairie at town's edge, eat a picnic lunch (your own), and go to Kark Prairie, 4 miles from Chatfield. *Reservations are requested by July 10.* Call (507) 867-3129, or write Timothy Gossman, RR1, Box 110A, Chatfield, MN 55923.

3) **REDISCOVER THE URBAN PRAIRIE.** Twin Cities, Saturday, July 23, 10 AM to 3 PM. Bob Jacobson (MnDOT) and Dave Olfelt (MnDNR) will lead caravan to little-known prairies along the Mississippi and Minnesota Rivers in the metro area. *Reservations required.* Call Dave at for map, directions and other details. Bring lunch.

4) **GULLY FENS.** Polk County. July 30, 1994, 10 AM. Gully is near Bemidji, 1.5 hr drive from Itasca Park. Joint with *Nature Conservancy*. Gully Fen is a mixture of prairie and boreal forest fen species. A 2.5 to 4-mile hike. Nancy Sather (botanist/ecologist) is the leader. Take Hwy 92 north from Bagley. Gully is 1/4 mile north of 92 on Polk County #2. Meet at "Gully Mall"—old elementary school on south side of Gully. Bring lunch. No trails, no facilities, rough terrain, some wading—*Be prepared!*

5) **MINNESOTA PRAIRIE DAY.** Saturday, August 13. Details of field trip not final now. For information please call DNR for details: 296-6157, or 1-800-766-6000. (see also page 7)

(continued column 2)

6) **SAVAGE FEN WETLAND COMPLEX,** Savage, MN, Saturday, August 27, 10 AM to 2 PM. Led by Steve Eggers (Corps of Engineers) to 112-acre parcel of land newly acquired by USFWS. There are 45 acres of calcareous fen with 7 state-listed plant species. Compare management with adjacent 26-acre site intensively managed since 1986. Small mesic prairie also. Call Steve Eggers for directions and map:

For all trips, be prepared for rain, mud, and insects; bring lunch, field guides, lenses, binoculars, as usual. Check on reservations. Enjoy!

—Nancy Albrecht and B.J. Farley

Ninety-one persons attended the MNPS spring symposium on native plant-organism interaction

This Symposium of MNPS on *Native Plants and their Interaction with Other Organisms* was held Saturday, March 19, 1994, in the University of Minnesota Earle Brown Center. Speakers were Catherine Reed, entomologist at the University of Minnesota, who described insects and pollination of native plants; ecologist Mark Davis of Macalester College, who portrayed the interrelations of gophers, fire, oak, and *Penstemon*; ecologist Patrice Morrow of the University of Minnesota, who related companion plant effects on goldenrod and herbivores; and plant biologist Iris Charvat, of the University of Minnesota, who explained the role of mycorrhizae in wetland plants. All talks were superbly illustrated. The number and quality of questions reflected the high quality of the presentations. Congratulations! And Thanks! also to moderator Chase Cornelius, and the Planning Committee of Don Knutson and Sandy Bergeron.

ERRATUM

In the article on *Pollination Notes on Minnesota Orchids* (Minnesota Plant Press 13 12[:4-5, 1993), the first sentence of the third paragraph in column 2 on page 4 should begin: "The primary pollinators..." instead of "The larval pollinators..."

Thanks! from the Board to many Society members

The Board thanks the following for their contributions to the Society activities and events in the past year.

Nancy Albrecht for her work in planning field trips...

Sandy Bergeron for her work as facilities chair for the spring symposium...

John Buffalow for volunteering to handle treats for 1994-95...

Chase Cornelius for serving as liaison in editing the newsletter...

Grace Gray for arranging car pooling...

Diane Hilscher for the general meeting program planning, outreach and member packets, and answering letters...

Linda Huhn for handling the audio-visuals for meetings, and for agreeing to serve as board secretary for 1994-95...

Don Knutson for his work in planning the spring symposium, and keeping the display board...

Thor Kommedahl for editing the newsletter...

Char Menzel for handling the plant sale and refreshments during the year...

Rae Montgomery for mail pickup and distribution to officers...

Marcie O'Connor for maintaining the membership list...

Ruth Phipps for service as treasurer, including acting as cashier at the symposium and the plant sale...

Mary Risdall for help with refreshments...

Roy Robison for labeling and mailing of MNPS publications and notices...

May Wright for handling the seed exchange, and refreshments...

And others on committees and functions!

—Rebecca Schirber, President

Treasurer Phipps reports income from plant sale

Ruth Phipps, treasurer of MNPS, reported an income of $281 from the plant sale of May 4, 1994. There were 256 plants that sold for $1 each and one double-flowered bloodroot that sold for $25, giving a total of $281. Thanks to all!

Medical Garden at The Bakken opened June 4

The Bakken Library and Museum of Electricity in Life opened its medical garden on June 4, 1994. This garden includes herbs and shrubs known for their medicinal and healing attributes; many of these plants are native to Minnesota. One can see: *Angelica, Artemisia*, wild indigo, foxglove, purple coneflower, garden heliotrope, spikenard, and wild ginger. In addition, there is a a display of herbals. The Garden is open Saturdays from 9:30 AM to 4:30 PM, and, by appointment during the week from 9 AM to 5 PM. Admission is $3 for adults, $2 for students and seniors. For details call 612-927-6508.

Donor Members for 1994

The following members of MNPS are Donor Members.

Grace Gray
Enid Larson Griffin
Charles Jorgensen
Sally Jorgensen
Peg Kohring
Donald Lawrence
Doreen Lynch
Doug McEvers
William Ramsden

MNPS thanks these members for their generous contributions!

—Ruth Phipps, treasurer

MNPS Display Board Use

All members are welcome to show our display board at events, museums, and schools, if an attendant is present or it is safely displayed. This 3 by 5 foot, 2-sided board holds information on the Society, native plants, and stewardship. Call Don Knutson

Program planner Diane Hilscher seeks speaker suggestions for 1994-95

We hope that those who have attended the monthly meetings have enjoyed them. We had excellent presentations from inspired speakers on a wide range of topics. Speakers also submitted summaries of their presentations. A warm "thank you!" goes out to our main speakers as well as to those covering a "Plant-of-the-Month" and organizing our two annual events: the seed exchange and the plant sale.

Our Vice-President Diane Hilscher will be planning the monthly programs again for 1994-95. Please give her a call with your suggestions for speakers or general topics that interest you. We also look forward to gaining an understanding of individual plant species in our Plant-of-the-Month offerings. You don't have to be a botanist–just be a person willing to research the plant a bit and take or borrow a few slides to share them with members. For suggestions or to volunteer, call Diane Hilscher at

Wild River State Park offers summer programs

Wild River State Park will offer its usual summer naturalist programs for park visitors, with an evening program every Friday and Saturday night from Memorial Day to Labor Day, plus afternoon programs on weekends. Programs are free but admission to the park requires a vehicle permit.

The park's annual photo contest will be judged on Friday, August 12, with winning photos displayed from August 13 to 21 at the park's interpretive center, and the following week at the North Branch Library. Wild River State Park is located on the St. Croix River, 3 miles north of Almelund, Minnesota, between Taylors Falls and North Branch, on Highway 95. For contest rules or details about the park, call Dave Crawford

Botanical potpourri

GLEANINGS FROM NEWSLETTERS

False rue anemone *(Isopyrum biternatum)* is always the first wildflower to bloom in the Eloise Butler Flower Garden according to *The Fringed Gentian* (44[1] 1994).

Oak forests are life support systems for many animals that live in them because of the habitat and the acorns they provide...perhaps extensive forests should be managed for acorn production. (*North Central News*, January 1994)

Populations of *Vallisneria americana* have declined but populations of *Myriophyllum spicatum* have increased in waters of the Upper Mississippi River report J.W. Bank and associates.(*River Almanac*, November 1993)

The inflated succulent pods of the buffalo bean (*Astragalus crassicarpus*) are edible and taste very similar to garden peas reports Wayne Ostlie. (*The Nature Conservancy*, Spring 1994)

The US Department of Interior's newest agency, the National Biological Survey, is budgeted in 1995 for an increase of 6% to total $176.8 million. (*Forum* 12 [6], 1994).

The Chippewa National Forest biologists are analyzing a Forest Plan Revision to include studies on biological diversity and ecosystem management prior to data collection during 1994 and 1995. (*Chippewa Quarterly*, January 1994)

The USDA Forest Service in Ely, Minnesota, proposes to thin approximately 585 acres of red pine in stands planted approximately 48 years ago. This proposal would remove approximately 35% of the trees on the 585 acres—about 29,000 trees—leaving approximately 53,000 trees (90 trees per acre) after the thinning. More information is available from Kawishiwi Ranger District, Superior National Forest, 118 South 4th St., Ely, MN 55731.

Letters

Shrubs and hedges
Our home is bordered with evergreen trees. Last fall we needed to trim off the bottom branches up to 6-8 ft. My question is, are there suitable shrubs or hedges that will grow next to the tree line, to get back privacy from the roadside? There is also one section where previous owners planted lily-of-the-valley. Is there any other kind of perennial that will also live in this soil. This section is half sand, half black dirt. Wild strawberry-looking plants thrive in this section of partial shade. Any information would be helpful—Renee Kneeland, Cushing, MN.
(The Minnesota Extension Service has publications: FO-0604 Fitting Trees and Shrubs into the Landscape [$0.50]; BU-5777 Ground Covers for the Midwest [$14], in color—ed.)

Wildflowers and houseplants
I'm really interested in wildflowers. I would love to see wildflowers in my backyard....are there any wildflowers that can be houseplants? Could you send me information on growing wildflowers and other information [on wildflowers].—Carrie Matthews, Grand Blanc, MI. *(Minnesota Extension Service has a folder FS-6065 Common Questions about Wildflowers and Native Plants [$0.25]but it may be better to consult Michigan State University Extension Service, East Lansing, MI, for Michigan conditions*—ed.)

Oak wilt and ash yellows
I don't know if this information is along your line of expertise or not, but I'm wondering about the diseases oak wilt and ash yellows...Whatever information you have on these diseases, send it to me soon. Thanks.—Tom Donovan, Hill City, MN. *(The Minnesota Extension Service has one brochure MI-5898 Ash Yellows in Minnesota [$1.00], and another MI-3174 Oak Wilt in Minnesota [free]*—ed.)

Orchid pollination and chapters
Recently, I borrowed your newsletter, the *Minnesota Plant Press*, from a fellow graduate student here at North Dakota State University (NDSU) and read the article by Charles Argue on native orchid pollination. Congratulations on producing such an attractive and informative newsletter.

I am planning to continue studies at NDSU in ecological entomology with a study on the insect ecology of the western fringed orchid with study sites in western Minnesota and eastern North Dakota. I am writing to you to ask who in the MNPS might be working with pollination, seed germination, or propagation of our native terrestrial orchids. Also, does the Society occasionally meet in western or central Minnesota? —Rose Emily Heine, Fargo, ND. *(We appreciate your interest and thank you for the compliments! Are there MNPS members interested in providing information for Ms. Heine? MNPS has an agenda item at the retreat to discuss possible outstate chapters*—ed.)

Bulletins or brochures can be ordered from the Minnesota Extension Service, Distribution Center, 20 Coffey Hall, 1420 Eckles Ave., St. Paul, MN 55108-6069. If any MNPS member would like to respond to any of these letters, contact the editor for the address.

A writer from Nebraska requests seeds of Indian Pipe. Any supply? –ed.

Plant Lore

What is Indian pipe?
Indian Pipe is a perennial seed plant that lacks chlorophyll, known also as *Monotropa uniflora* in the wintergreen family.

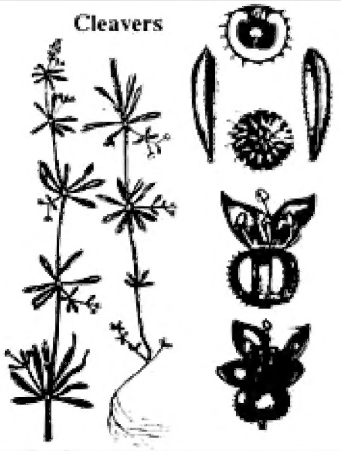
Why is it called by these names?
Monotropa means "one turn" because the flowers point down when in bloom, complete one turn, and point up when fruits are mature. When the flower is down the plant resembles an Indian peace pipe.

Where can one find Indian pipe plants?
Plants are found in forests at the bases of pine trees mainly but also near oak and maple trees. They are found in wooded areas from southeast to northern Minnesota.

If the plants lack chlorophyll how do they grow and survive?
Plants are epiparasites of tree roots, and form a three-way symbiotic structure with mycorrhizae. In some respects, the plant is parasitic on the fungus, for trees derive nutrients from fungi that grow on its root surfaces.

What are the fruits and seeds like?
Plants produce capsule fruits and seeds that are minute and resemble fine, brown sawdust. It is thought that flowers are pollinated by insects but little is known about kinds and methods.

(from D. Stokes, and L. Stokes. 1984. Enjoying Wildflowers. Boston: Little Brown)



What do cleavers and coffee have in common?
Cleavers or bedstraw (*Galium aparine*) is in the same family as coffee—the madder family. Cleaver seeds when lightly roasted make a caffeine-free substitute for coffee.
How can one identify this plant?
It is an annual, with weak, bristly, 4-angled stems; bristly fruits; and small white flowers. Stems often form dense mats in thickets and woods.
–Magic and Medicine of Plants

The Minnesota Landscape Arboretum
and
The Nature Conservancy
present

MINNESOTA PRAIRIE DAY

Lecture Program and Tours

Saturday, August 13, 1994

8:30 a.m. - 3:00 p.m.

Once upon a time, there were 18 million acres of prairie. The surviving prairie acres are home to dozens of rare and endangered plants and animals, and contribute greatly to the natural beauty of our state.

Join us at the Minnesota Landscape Arboretum in Chanhassen for an overview of prairie biology and a presentation on fire management. We will then tour the Arboretum's reconstructed prairie ecosystem to see native flowering grasses and plants that are being reintroduced. After lunch, we will board a bus for a half-hour ride to Schaefer Prairie (between Glencoe and Brownton), a native prairie preserved and managed by the Conservancy since 1967. Interpretive guides will discuss the unique flora of the prairie, the history and role of Schaefer Prairie, its protection and fire management programs, and its role in seed harvesting and prairie restoration. The Arboretum has obtained some of its own reintroduced plants from Schaefer Prairie.

Our leaders for the day will be Chase Cornelius, a volunteer with the Arboretum and the Conservancy, and Louise Morgan, Volunteer Coordinator for The Nature Conservancy. Other prairie naturalists will co-lead tours.

WHERE: Meet at the Minnesota Landscape Arboretum–9 miles west of 494 on Highway 5 in Chanhassen.

WHEN: Check in between 8:30 and 8:55 a.m. on Saturday, August 13. Pre-registration recommended.

WHO: This trip is recommended for adults and children over 12.

WHAT: The Arboretum has grass-mowed paths that are sometimes uneven; expect to walk up to three miles within an hour. The hike at Schaefer Prairie (on mowed firebreaks) will last about 1-1/2 hours. Wear clothing appropriate to the weather, sturdy waterproof footwear or boots, and bring a hat, sunscreen and insect repellent. THERE ARE NO RESTROOM FACILITIES ON SCHAEFER PRAIRIE--we will leave the Arboretum around 12:30 and return about 3:00 p.m.

FEE: **$15 for Arboretum and Conservancy members; $20 for non-members. Limit 45 people.** Payment for this activity includes the Arboretum regular gate admission and parking. Bring your own bag lunch to eat at the Arboretum's picnic grounds, or purchase lunch at the Arboretum Tearoom. A full day's agenda will be mailed back to you upon registration. **Mail check with form below, payable to:**

THE NATURE CONSERVANCY, Attn: Janet, 1313 5th Street SE, Box 110, Minneapolis, MN 55414.

Questions? Call the Arboretum Special Events Department at 443-2460, ext. 227.

Name(s) _____

Address _____

City _____ **Zip**_____

Phone _____

List all names at one address, or can photocopy form for others

Check if:

- ❑ Arboretum Member ($15)
- ❑ Conservancy Member ($15)
- ❑ Non-member ($20)

Total Amount Enclosed $_____

(Check payable to The Nature Conservancy)

Minnesota Native Plant Society
University of Minnesota
220 Biological Sciences Center
St. Paul MN 55108